OCTOBER 6, 1997 VOLUME 14, NUMBER 40

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

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GIGABIT ETHERNET FACE-OFF

Network World this week hosts a battle among start-ups and established vendors at N+I. Page 10.

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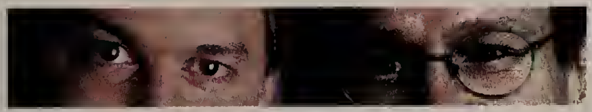

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Which is the better approach?

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New WorldCom order

Customers optimistic about carrier's surprise $30 billion takeover bid for rival MCI.

By David Rohde and Denise Pappalardo
New York

Heaven on earth could follow a period of pain and suffering if emerging network titan WorldCom, Inc. succeeds in swallowing MCI Communications Corp.

A striking number of users and analysts last week put aside the usual fears of merger-induced vendor upheaval and service degradation to praise WorldCom's surprise unsolicited $30 billion takeover offer for MCI.

The reason: The two companies' have a stunning collection of broadband network assets that support circuit and packet switching.

WorldCom Chairman and CEO Bernard Ebbers last week made the out-of-the-blue offer for MCI on the same day

See WorldCom, *page 129*

"We can offer far greater synergies than BT can. They just don't live here."

Bernard Ebbers, WorldCom chairman and CEO, to MCI shareholders and customers

AP PHOTO

SNAfu: Vendor group gets off to a rough start

By Marc Songini

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The alliance was supposed to include IBM, Cisco Systems, Inc., Electronic Data Systems, Inc. and OpenConnect Systems, Inc. It planned to meet for the first time at NetWorld+Interop 97 and announce itself to the world.

The only problem is, SNA leaders IBM and Cisco are not so sure

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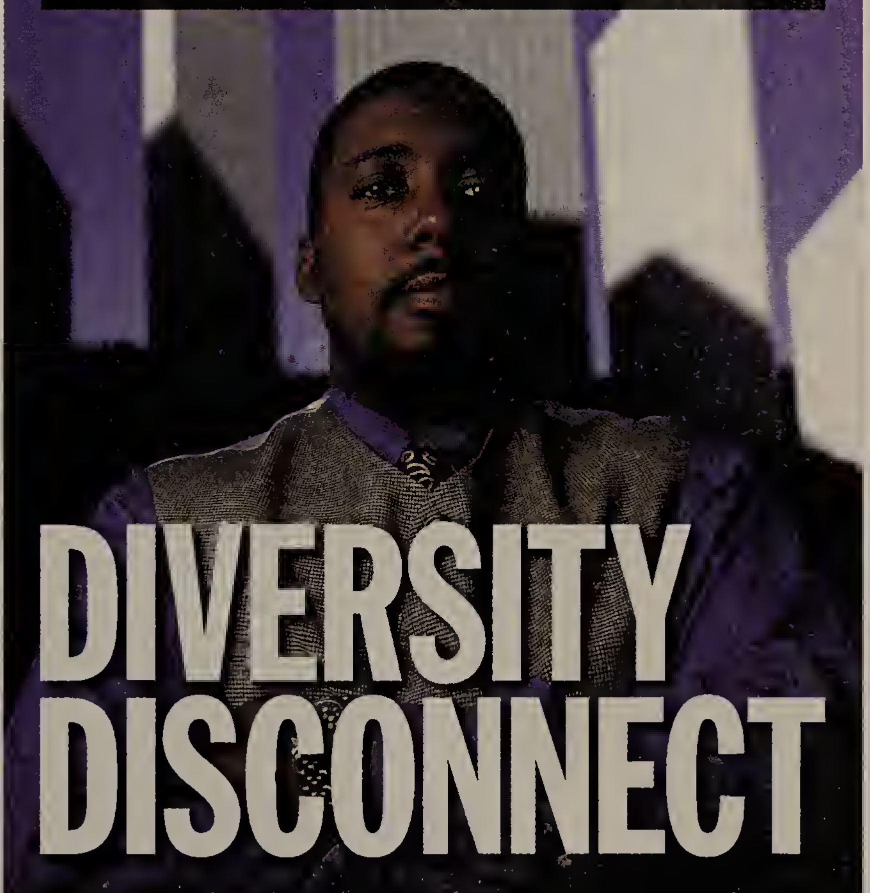
SPECIAL REPORT: DIVERSITY IN NETWORK IS



DIVERSITY DISCONNECT

Our investigation delves into the gender and race gap in network IS. First of two parts.

By Charles Bruno

Jesse Rodgers had been standing watch over LANs at paper products magnate James River Corp. for more than 11 years, so he knew his network skills were sharp. He was confident senior IT management would promote him from net supervisor to network manager, even considered it a formality. After all, he already was responsible for key e-mail, Internet connectivity, server administration and other network services. His only competition was a project manager who, although he had a year or two of seniority, lacked comparable network skills.

Rodgers' network world came crashing down when management handed the job to the other candidate. Rodgers was told he lacked management points, although the company never clarified that explanation.

Rodgers, pictured above, believes he was passed over because of race. He was the only African-American on the network staff. The other candidate was Caucasian. "I had the responsibilities of a network manager, but they wouldn't give me the title," he says.

A James River spokesman wouldn't comment on Rodgers' case, saying only that the company has a diversity program that is updated frequently.

Look around your office, or next time you're at a trade show, scan the faces in the crowd. Chances are you won't spot many women, African-Americans, Hispanics or other minorities. And if you do, the odds are even longer that they hold senior network management positions.

See Diversity, page 93

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Q&A Take it from the top

Cisco CEO John Chambers talks about the changing internetwork battlefield. Read his views on:

- Microsoft: A partner or a threat?
- Gigabit Ethernet: Why Cisco is taking its time delivering.
- New router start-ups: They have a tough road ahead.
- 3Com/USR: The challenges the merged rival faces.

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ATM upgraders in for forklift surprise

By Jodi Daniels and Jim Duffy
Atlanta

Users looking to add Layer 3 switching to their ATM networks could be in for a rude awakening.

Depending on the equipment they use, customers may face a disruptive and costly upgrade to add Multi-Protocol over ATM (MPOA) capabilities to network edge devices. MPOA allows ATM backbones to support Layer 3 applications and protocols, such as IP and IPX, and lets them take advantage of ATM's quality-of-service features.

For some equipment —

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- A slew of security products are on tap. Page 131.

NETWORLD+INTEROP 97

Actra on shaky ground?

Troubles plague Netscape-GEIS e-commerce venture.

By Ellen Messmer

In April of last year, Netscape Communications Corp. and GE Information Services, Inc. (GEIS) formed Actra Business Systems LLC, a joint venture that was supposed to be the happy marriage of electronic data interchange and the 'Net.

While the technologies seem to be getting along fine, the companies behind them are not so harmonious.

The first products of that union — Actra's ECXpert for EDI translation of HTML and SellerXpert for sales tracking and analysis — look strong and healthy. But because of turf squabbles and differing interests, the marriage between GEIS, the EDI veteran, and Netscape, the browser upstart, may be in trouble.

The reason? As distributors, GEIS and Netscape are compet-

See **Actra**, *page 126*

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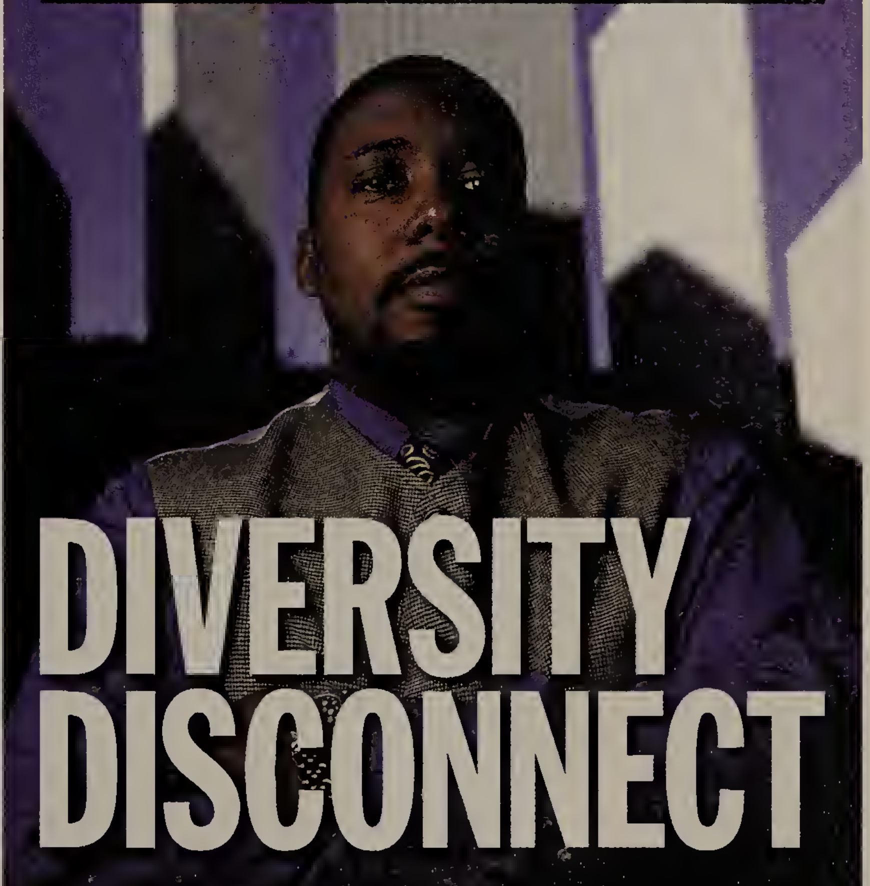

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See Diversity, page 93

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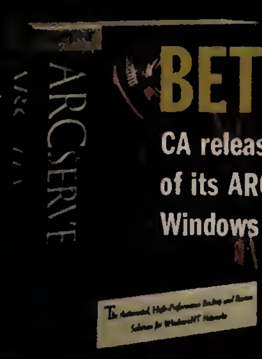

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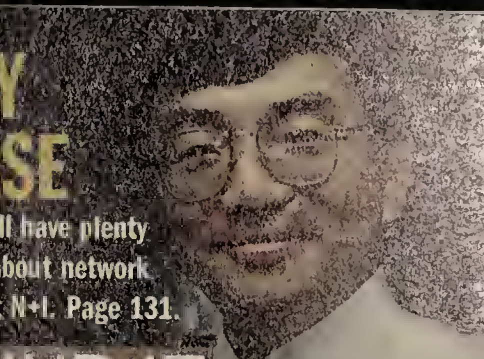

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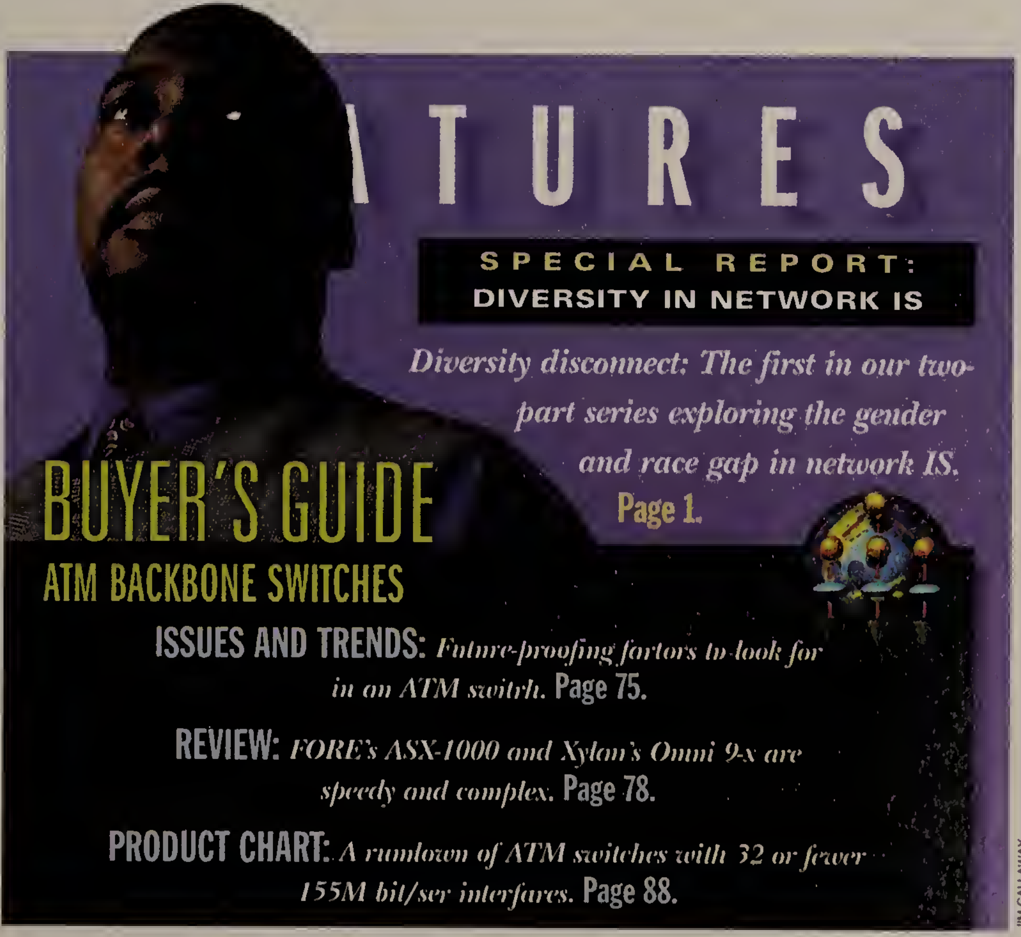

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This Week

Only on Fusion

Keeping Current. What does WorldCom know that British Telecommunications doesn't? Fred McClimans looks at why the upstart carrier is willing to pay 50% more for MCI – and why other network vendors are willing to take similar risks in Gigabit Ethernet. **DocFinder: 4129**

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Network computing. Network computers or NetPCs? Read our print battle between Sun and Microsoft (page 71), then link up with Fusion for an online conference on the topic that features an audio primer, background articles and reader comments. **DocFinder: 4127**

Opinion. We've begun posting our weekly editorials in conference form. So, have an opinion about this week's editorial on AT&T (or any other topic, for that matter)? Connect to nwfusion.talk and tell us (and other readers) what you think! **DocFinder: 4128**

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News briefs, October 6, 1997

The never-ending Java war

■ The Java wars between Sun Microsystems, Inc. and Microsoft Corp. seemed to be heating up yet again last week. Sun hinted it is doing internal testing of the new Microsoft Corp. Internet Explorer 4.0, which runs Java applets, to see if it is truly compatible with the Java Development Kit (JDK) 1.1 specification. Microsoft, a Java licensee, has already acknowledged it is not using some JDK 1.1 features, such as Remote Method Invocation. Sun declined to discuss whether it might take legal steps based on the outcome of its testing, the results of which could be released today.

Lotus Notes wizard moves on

Ray Ozzie *is leaving Lotus and his Notes behind.*

■ Raymond Ozzie, known as "the father of Notes," is leaving Lotus Development Corp.'s Iris Associates business to found his own company. Ozzie, 41, will start Rhythmix Corp. along with his brother, Jack, another longtime Notes developer. Ozzie's new venture, details of which he would not discuss last week, will maintain an as-yet unannounced relationship with Cambridge, Mass.-based Lotus. Separately, Lotus announced shipment of its Domino 4.6 server, Notes 4.6 client, Domino Mail 4.6 server and Notes Designer for Domino 4.6 application development tool. Lotus' parent company, IBM, announced the general availability of Domino for S/390.

Modems for sale

■ Motorola, Inc. last week was rumored to be shopping around its modem division, which holds several key patents for 33.6K bit/sec modems. Those patents also would be key to 56K bit/sec modems, so the newer, faster modems could talk to the slower, older ones. The sell-off speculation comes at a time when other modem vendors are complaining Motorola is trying to charge too much for rights to its patents. Motorola officials could not comment.

Up next: NextPoint

■ A start-up everyone's been talking about, NextPoint Networks, Inc., will debut this week at NetWorld+Interop 97. It will unveil its NextPoint S^3 software, which it claims uses Web technologies to deliver business-centric, service-level network management.

Cisco goes gigabit

■ In addition to displaying Gigabit Ethernet modules for the Catalyst 5000 LAN switch line, Cisco Systems, Inc. this week is expected to demonstrate a Gigabit Ethernet module for its routers at NetWorld+Interop 97 (*NW*, Sept. 29, page 1). Last week, Cisco added an Ethernet switching module to its 7200 series routers and digital modem technology to its 3600 remote access server. The EtherSwitch module will be available in November for $5,495. The Modem ISDN Channel Aggregation modules for the 3600 are available now and priced from $1,700 to $8,600.

Cisco's 7200 routers *now have an Ethernet switching module.*

Powerful partners

■ 3Com Corp., Newbridge Networks, Inc. and Siemens this week are scheduled to announce a partnership that would give 3Com the backbone switch technology it needs to get a foot in the door to the carrier market. Newbridge already has merged its MainStreet ATM switch technology with Siemens switch technology and has developed a common management platform called MainStreetXpress. 3Com, with its acquisition of U.S. Robotics earlier this year, has the Total Control Hub remote access concentrator, but no true backbone switch to compete against offerings from the likes of Cisco Systems, Inc. or Ascend Communications, Inc.

Novell plans to deliver on Windows NT promises

By Christine Burns

Atlanta

Entrenched in a fight for its life against the rising threat of Windows NT, Novell, Inc. will show off several new wares designed to ease the hassles of managing the NT machines and services that have made their way into customers' IntranetWare strongholds.

At NetWorld+Interop 97 here, Novell is expected to unveil details about a long-awaited version of its Novell Directory Services (NDS) that runs natively on NT Server. The software provides full management and integration of NT- and IntranetWare-based services.

While the company originally had planned to deliver this product by the end of last summer, officials pushed back the release to integrate more features. One key feature, said sources close to the company, is the ability to manage existing NT 4.0 domain parameters from within NWAdmin, the well-known NDS administration tool set.

The Hillsboro County, Fla., government is looking for a way to tie several NT application servers into its 2,000-seat IntranetWare network. Technology manager Bill Kannberg said NDS for NT is an option, but only if Novell actually provides a unified management scheme.

"If my administrators can use the NDS skill set they've already cultivated, then I would use it. But Novell has to really prove that to me, because I can't afford to train everybody in two operating systems," Kannberg said.

Novell also will announce several new features of its ManageWise desktop management suite that allow an administrator to monitor and remotely manage distributed NT 3.51 and 4.0 desktops. Other additions include software and hardware inventory and reporting tools that provide sophisticated maps of all desktop and network resources.

Analysts expect these features to offer more granular control over NT desktops than is currently available through Novell's IntranetWare client for NT and its Workstation Manager.

"This stuff has been missing for a while. It will be welcomed into the fold like a lost relative," said Todd Chipman, a senior analyst with Giga Information Group, in Santa Clara, Calif.

Additionally, Novell for the first time is ready to demonstrate the next version of IntranetWare — code-named Moab — that is due out in the first half of 1998.

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Chat while you shop the 'Net

By Denise Pappalardo

Internet voice pioneer VocalTec Communications, Ltd. is rolling out a software package that will let Internet visitors initiate voice calls over the 'Net — right from your Web site.

Surf&Call, which will be introduced at NetWorld+Interop 97 this week, comprises two pieces of software, a gateway and a Web server. The gateway software is designed for VocalTec Telephony Gateway 3.1, which is typically connected to a call center or PBX voice switch.

The software is installed on a per-channel basis, making it easy for users to add additional channels if call volumes are high. It also is more flexible this way. For instance, if a user has a 24-channel PBX, he may only want to receive Web calls on a handful of those channels.

The software, largely for electronic commerce and customer service, boasts a simple user interface. A Web visitor merely clicks on a "call now" icon to initiate the Web phone call. This eliminates the need to send e-mails or call an 800 number after a user goes offline just to get a simple question addressed, said Ido Ganor, director of product marketing at VocalTec, of Herzliya, Israel.

Not the only one

MCI Communications Corp. has a similiar plan. Earlier this year, it announced its Vault technology and service plan that essentially will link the public switched telephone network with the Internet. While this plan is still in development, users will be dependent on the carrier to support the service. On the other hand, VocalTec's technology today lets users install and maintain the systems themselves.

The Web server software includes a plug-in client file that lets a PC communicate with a Telephony Gateway at the other end. The Internet user must have a 486-/33-MHz multimedia PC with 12M bytes of RAM. The Telephony Gateway 3.1 with Surf&Call requires a dual Pentium 200-MHz Pro PC or higher running Windows NT Workstation 4.0.

VocalTec's system is relatively easy for users to implement because much of the integration has already been done by the vendor, said Hilary Mine, senior vice president at Probe Research, a Cedar Knolls, N.J.-based consulting firm.

Surf&Call is available for $150 per channel.

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Be a NET KNOW-IT-ALL

For the **answer** to this week's question and more net trivia, **visit Network World Fusion** and enter **2349** in the DocFinder box.

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This week's question:

What do Novell's Eric Schmidt, Compaq's Roel Pieper and IBM's Irving Wladawsky-Berger have in common? (A hint: Think Interop)

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Cisco pours on price pressure in Ethernet switch market

By Jim Duffy
San Jose, Calif.

Cisco Systems, Inc. last week rolled out extensions to its Ethernet switch line and reduced prices of up to 50% in an effort to gain price/performance leadership.

The additions presage a new Catalyst LAN switch chassis Cisco is expected to unveil later this month. The chassis, which beta users referred to as the Catalyst 5505, sports five slots and a 3.6G bit/sec backplane.

Cisco last week confirmed the new chassis will be announced later this month, but would not confirm the name or provide other details. Observers said the Catalyst 5505 will provide the bandwidth necessary to take users of the Catalyst 5000 — a five-slot, 1.2G bit/sec switch — to Gigabit Ethernet. Cisco will ship a new Gigabit Ethernet supervisor module early next year that requires more juice than the Catalyst 5000 can muster, they said (*NW*, Sept. 29, page 1).

Among last week's announcements were new switching modules for the Catalyst 5000 series, enhancements to the Catalyst 2901, and Enterprise Editions of the Catalyst 1900 and 2820 switches.

Additions to the Catalyst 5000 family include a 48-port 10Base-T Ethernet switching module, a 24-port 10M/100M bit/sec autosensing module and two Fast EtherChannel modules.

The 48-port Ethernet switch card increases the port density of the Catalyst 5500 to 528 switched Ethernet connections and will bring down the cost of 10M bit/sec Ethernet to less than $185 per port.

The 24-port 10M/100M bit/sec autosensing module features twice the density of Cisco's previous 10/100 autosensing module for the Catalyst 5000, but at the same cost. This module will increase the Catalyst 5500's density to 264 ports for approximately $495 per port.

"[The price reductions] are what these guys need to do in order to start driving real volumes," said Esmeralda Silva, an analyst at International Data Corp., in Framingham, Mass. "They're basically going after the desktop market, and that market is all about price."

If Cisco is now the price leader in Ethernet switching, its reign could be short-lived. Analysts expect responses from 3Com Corp. and/or Bay Networks, Inc.

Meanwhile, Cisco's new Fast EtherChannel modules sport 12 ports and come in two flavors — 10/100Base-TX and 100Base-FX. With these new line modules, the Catalyst 5500 will be capable of supporting 144 Fast EtherChannel ports at less than $1,000 per port, Cisco said.

Fast EtherChannel is a Cisco technology for aggregating multiple full-duplex Fast Ethernet links into a high-speed pipe that approaches 1G bit/sec. Cisco is positioning Fast EtherChannel as a transitory step to Gigabit Ethernet.

For those sticking with Fast Ethernet, Cisco has slashed the price and bulked up the enterprise software feature set of the Catalyst 2901, a 14-port 10M/100M bit/sec autosensing switch. Cisco has lowered the cost of the 2901 by 40%, to $643 per port. It also has added its Group Multicast Protocol and dynamic virtual LAN capabilities, as well as enhanced security to the switch.

The Catalyst 1900 and 2820 also have been ruggedized for enterprise duty.

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THE SKINNY ON CISCO'S SWITCH PRODUCTS

Product	Price	Availability
12-port Fast EtherChannel cards	$9,995 for copper, $14,995 for fiber	Now
24-port Catalyst 10M/100M bit/sec card	$9,995	This month
48-port Catalyst Ethernet card	$7,495	Now
14-port 10M/100M bit/sec Catalyst 2901 switch	$8,995	Now
12-port Catalyst 1900 Enterprise Edition switch	$2,195	Now
24-port Catalyst 1900 Enterprise Edition switch	$2,695	Now
24-port Catalyst 2820 Enterprise Edition switch	$2,695	December

Bright Tiger pounces on Web mgmt

Start-up combines replication and clustering technology to keep Web sites humming.

By Bob Brown
Acton, Mass.

Engineer Kathy Wilde learned a few things about server clustering at Digital Equipment Corp. and a few more things about database replication while working for Lotus Development Corp.

Last year, she struck out on her own to put this technology know-how to new use. The result is start-up Bright Tiger Technologies, which this week will announce software for building reliable Web sites based on intelligent server clusters.

Wilde, Bright Tiger's chief technology officer, saw that private and public Web sites were becoming harder to manage. Increasingly, they were based on multitiered architectures consisting of Web servers as well as interlinked database, application and file servers.

"With all these components, more can go wrong," said Larry Moore, a former colleague of Wilde's at Lotus who now serves as Bright Tiger's president and CEO.

Bright Tiger's ClusterCATS server software, which will be on display at NetWorld+Interop 97 in Atlanta, can detect failed servers and applications. It also can replicate content updates among Web servers across a LAN or WAN to ensure that information always is available. In addition, ClusterCATS can direct user requests to the optimum Web server in a cluster — what Bright Tiger calls a SmartCluster — by considering each server's processing load and distance from the end user.

ClusterCATS software initially runs on servers outfitted with Microsoft Corp. Windows NT and Internet Information Server. Bright Tiger, which has received $4.4 million in seed and first-round venture capital, has tested the software in server clusters consisting of as many as 20 machines.

Beneath the covers

The key to Bright Tiger's software is enabling servers in a SmartCluster to collect the data needed to make informed decisions about how each end-user request should best be handled, said Jim Hourihan, vice president of marketing.

Servers send messages to each other periodically to figure out which servers are up or down. These heartbeat messages, sent via TCP/IP, also can be used to determine other servers' processing loads and the time it takes to send data from one server to another.

In addition, Hourihan said ClusterCATS sends SQL queries to back-end databases to check their status, issues probes to Lotus Development Corp.'s Lotus Notes and other back-end applications, and taps into NT file systems to stay updated on the status of Web server content.

As each server collects new information, it passes any changes along to the other servers. That information can be used by ClusterCATS to redirect end-user requests away from a downed application or to help synchronize data updates.

Data collected by ClusterCATS can be used by network managers running Explorer, Bright Tiger's client program. The client program lets administrators review trends and receive problem alerts.

Bright Tiger's software can complement more basic clustering technologies, such as Microsoft's Cluster Server (formerly Wolfpack), which Hourihan said are concerned mainly with server failover and limited load balancing.

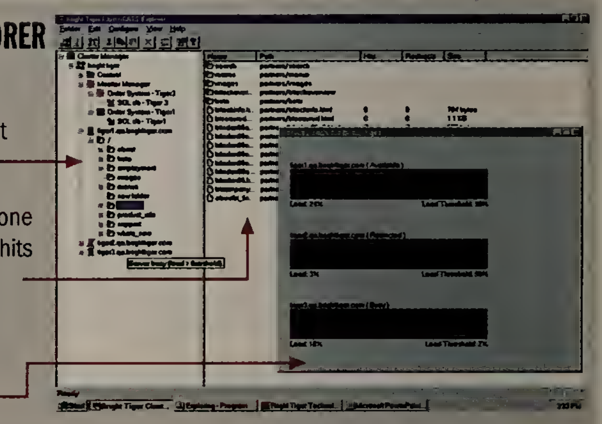
Andersen Worldwide has been encouraged by its test of Bright Tiger beta code on three Compaq Computer Corp. servers running NT. The company wants to roll out the technology to support new global revenue and account reporting applications.

"Bright Tiger should help us optimize the placement of data for Web applications vs. network speeds," said Dan Nottke, principal in charge of networks, development, architectures and security at Andersen in Chicago.

ClusterCATS software for two servers costs $9,995 and is available this month.

© Bright Tiger: (508) 263-5455

BRIGHT TIGER'S EXPLORER WEB SITE MONITOR



A listing of servers, content and monitors in a cluster.

Contents of a directory on one server, with information on hits and other attributes.

Graphs showing server availability and load thresholds.

Bay lashes back by slashing prices

You knew Cisco wouldn't hold its Ethernet pricing edge for long . . .

No sooner did Cisco Systems, Inc. announce 50% price cuts and claim leadership in Ethernet switch pricing, when Bay Networks, Inc. responded. Late last week, Bay announced price reductions of up to 20% for its BayStack 303 and BayStack 304 Ethernet switches.

The 25-port BayStack 303, originally list priced at $2,350, now costs $1,895 or $76 per port. The 13-port BayStack 304, originally list priced at $1,625, now costs $1,395 or $107 per port.

In addition to rock-bottom switch prices, Bay appears committed to almost giving away shared-media hubs. BayStack 150 Series 10Base-T managed hubs already are priced as low as $43 per port.

The company also claims leadership in the 10M/100M bit/sec autosense switch market with the BayStack 350, priced at $249 per port.

—Jim Duffy

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Circle Reader Service #**40**

Experts and customers to fire away during Gigabit Ethernet Face-off

Layer 3 capabilities and quality of service are the hot topics of the debate.

By Jodi Daniels
Atlanta

So far, Gigabit Ethernet has been all glory. Now it's time to get down to the guts.

That is why *Network World* is hosting the Gigabit Ethernet Face-off at NetWorld+Interop 97 here. The event aims to get beyond the hype about Gigabit Ethernet to determine just where this technology should be deployed, how it will integrate with existing networks and what vendors are best positioned to deliver product.

A pair of industry analysts will grill gigabit gurus from Alteon Networks, Inc., Bay Networks, Inc., Extreme Networks, Inc., Foundry Networks, Inc., Prominet Corp. and 3Com Corp. with technical questions, hoping to find out what is real and what is not. One of the analysts who will be doing the questioning said he will push hard on the issue of CPU consumption of Gigabit Ethernet adapters.

"I don't think Gigabit-speed adapters are all that practical at the moment," said Kevin Tolly, president of The Tolly Group, a testing and consulting firm in Manasquan, N.J. "I haven't seen computing systems that can take advantage of such speeds."

Another key issue will be quality of service (QoS), Tolly said.

"This is the one thing that ATM can claim as a distinct advantage," he said. "Attendees will want to know what Gigabit Ethernet vendors have to say about QoS and just how important it is."

Analysts also will try to discern the level of Layer 3 functionality in these vendors' Gigabit Ethernet products.

"It's important to find out what routing protocols [the vendors] support, whether they are shipping Layer 3 capabilities now and where their routing experience came from," said panel member Don Miller, chief analyst of networking services at Dataquest, Inc., a market research firm in San Jose, Calif.

In addition to fielding questions from the panel of experts, vendor representatives will face questions from readers in the audience. Participants in a recent online Network World Fusion conference offered a glimpse of some likely hot topics.

One key issue might be network management, according to Betsy Zielinkski of MITRE Corp., in Bedford, Mass. "Are [vendors] planning to offer any value-added management services?" she asked. "An idea might be QoS/class-of-service management, specifically informing the administrator how far the service has degraded beyond that specified in the service-level agreement."

Northern Telecom, Inc's Tony Rybczynski — another Fusion fan — wondered how ATM and Gigabit Ethernet will coexist. "Given that certain departments may opt to go with ATM workgroup solutions, how do [vendors] propose to carry interworkgroup cell traffic across the campus?" he asked.

Rybczynski also challenged the ease of upgrading to Gigabit Ethernet. "Most LAN switches cannot drive 1G bit/sec, therefore the concept that Gigabit Ethernet is a plug-and-play upgrade is a bit of a misnomer," he said. "The reality is that LAN forklifts will be required to take advantage of gigabit throughputs. Do vendors agree, and if everything has to be replaced, why not go with proven ATM?"

Other topics will include interoperability, product availability and pricing. ■

GIGABIT ETHERNET FACE-OFF

Who: Vendor participants from Alteon Networks, Bay Networks, Extreme Networks, Foundry Networks, Prominet and 3Com. Panelists include Kevin Tolly of The Tolly Group, Don Miller of Dataquest and *Network World's* Jodi Daniels. The debate will be moderated by *Network World* Editor in Chief John Gallant.

What: A presidential-style debate in which the vendor participants will field questions from a panel of experts, each other and audience members.

When: Noon, Thursday, Oct. 9

Where: NetWorld+Interop 97 in Atlanta, Room 202-East, Georgia World Congress Center

Exchange aims to simplify administration and use

Microsoft plans to release 'Platinum' version of Exchange following NT 5.0's delivery.

By Paul McNamara
San Diego

An early peek at the 1998 blueprint for Exchange Server and its Outlook e-mail/groupware client shows Microsoft Corp. plans to simplify directory and administration services, boost Web application development capabilities and make life easier for end users.

Microsoft previewed its plans at last week's Exchange Conference 97, which was attended by 3,000 IT professionals representing 1,400 companies. The turnout, a 50% increase over last year's inaugural event, reflects the growing interest in Exchange among corporate users and independent software vendors.

This future version of Exchange, code-named Platinum, is slated be released two to three months after NT 5.0 launches in mid-1998. A first-half of the year delivery is expected for Outlook 98.

"There is a killer feature in each release," said Exchange lead product manager Rob Shurtleff. "In [Exchange 5.5] it is the big message store, and in Platinum it will be [tying to] the NT 5.0 directory." Conference attendees were heartened to hear that Exchange will no longer require separate directory administration.

"That's always been a heartache of ours," said Tim Hickernell, senior IS engineer at Commonwealth Edison Co. in Chicago.

Microsoft also is promising administrators a single-console interface for managing all NT services, including Exchange.

That will be "a step in the right direction," said Ramesh Viswanathan, a systems analyst at Siemens Corporate Research, Inc., of Princeton, N.J., because the current management system "is out of hand. If they get their act together, it's sure to make it easier for people to administer."

At least one user was skeptical about Microsoft's promised timetable for these changes.

"The ideas sound good," said David Byrkit, e-mail administrator at ITT Avionics, of Clifton, N.J., "but I think they're talking about something that they're not too close to delivering."

On the application development side, Microsoft indicated additional Design Time Controls and wizards are on the drawing board. These will allow developers to funnel more Exchange services into their applications, as well as to enable more server-controlled events.

"We believe that more and more business apps will be hybrids of various traditional data stores and that the integrating place is on the Web," Shurtleff said.

As for Outlook 98, Microsoft intends to add features that will allow users to continue working on e-mail while synchronization or downloading takes place unseen in the background. The systems will cut download time by replicating only those fields that have changed. Additional standards support will be added, including Secure Multi-purpose Internet Mail Extensions and HTML Mail.

Also included will be a "Today's Outlook" view that captures a user's daily e-mail, calendar entries and task list in a single view. The company also hopes to simplify access to common features that sometimes get overlooked by casual users.

Simplification is the correct theme to emphasize, at least for one conference attendee.

"Some of our users might get overwhelmed by all the new features," said Brian Holle, e-mail administrator at Roche Bioscience, Inc., of Palo Alto, Calif. "I don't know how many of these bells and whistles we can keep loading on to people, but I did like them."

Exchange 5.5, previously code-named Osmium, remains on schedule for an end-of-the-year release, Shurtleff said. Its headline feature is an expanded message store. ■

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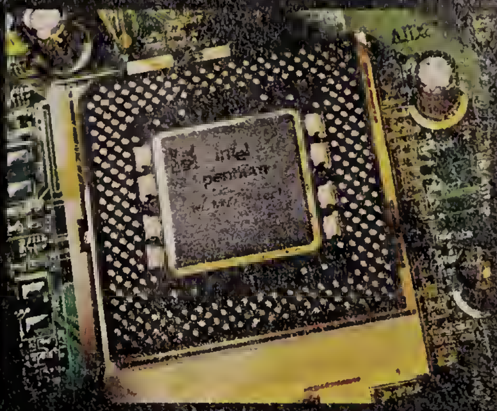

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*Circle Reader Service #***32**

Cisco CEO opens up on challengers

John Chambers takes on new and old rivals in his quietly confident, yet paranoid, way.

Q&A Cisco Systems, Inc. CEO John Chambers isn't in the limelight as often as Microsoft Corp.'s Bill Gates and Intel Corp.'s Andy Grove — the leaders of the other two companies in the so-called Wintelco triangle that rules the computing industry. But Chambers is no less outspoken and forceful than his cohorts, and he's not at all shy about proclaiming Cisco's dominance over the network industry. In an interview with *Network World* Editor in Chief John Gallant, Chambers explains how Cisco plans to maintain its control and talks about the threat from a new generation of routing start-ups, the evolving competitive landscape and Cisco's slow start in Gigabit Ethernet.

One of the things that is mentioned quite often these days is the Wintelco triangle — that Microsoft, Intel and Cisco have significant control over the industry. Do you think that triangle really exists?

One of our top priorities this year is strategic alliances. We have, in my opinion, a strategic alliance with Microsoft and Intel, but also with Hewlett-Packard, GTE, KPMG, and you'll see us fill in two or three more points.

I'm asking this in a different sense, though, beyond strategic alliances. Microsoft dominates the software industry and Intel controls the semiconductor industry. Is Cisco in the same position in the network industry?

If you look at our market capitalization, which is the financial community's expectation of the future, we are the size of the next 10 competitors combined. The financial market has already voted that they view us that way. We have the chance to shape the future of the industry. You will see us do that in a kinder, gentler way than some of the leaders have in the past, such as IBM.

Do you feel the technology position you have today is as secure as, say, Microsoft's?

Our goal is to make [Intel CEO] Andy Grove look relaxed in terms of his own paranoia. We worry about everything; I'm not secure at all. I'm extremely paranoid, and I think that's very healthy for a company.

Having said that, do I believe that we are the only company in the communications industry that controls this future? Yes, I do. So it's a matter of how well we execute, how we stay close to our customers and avoid the mistakes of companies that got into this position, or close to it, and then misstepped.

Most people tend to look at that kind of control as a negative. What's the benefit to customers?

Well, let's talk about a huge trend that is occurring at a pace faster than anybody dreamed. Customers are going to fewer vendors in the network. If you have fewer vendors in the network and perhaps a strategic vendor, and if you could bring in other partners that take it beyond the network, such as Intel or Microsoft or Hewlett-Packard — then the payback to the customer is huge. So what you are seeing in the enterprise accounts, in the service provider accounts and now the systems integrators, is not only fewer vendors but very serious consideration given to a primary vendor of the network, period. And our win rate here is extremely high.

And what is the risk of having this control?

That we misuse the relationship and we don't keep up our product leadership.

Do you see Microsoft as an ally or a threat? You are working with them in developing directory services, and yet, they've been fairly vocal that this Steelhead routing/remote access product is a competitor to some of your products.

If you ask Bill Gates or [Executive Vice President] Steve Ballmer, both of them would be very articulate in saying Cisco is a partner, period. We are not going to compete.

There was some initial positioning by some people in Microsoft and, candidly, by some outside people who want to stir the pot, about how [Steelhead] would be directly in Cisco's space. But if you look at their support structure, their distribution structure, it's not in their best interest to do that and I think they understand it.

The benefits of us working together far outweigh that one area of problems. Time will tell, but I believe that both Bill and Steve are very committed to partnership and they understand the value of partnerships in a way that perhaps they may not have or, would not have been willing to, a couple of years ago.

Your competitors to date have largely been the other three of the so-called Big Four data networking players. With 3Com's acquisitions, there's really a Big Two and then there are Cabletron and Bay. Are you more concerned about those companies still, or worried more about the Lucents, Nortels, and other big phone switch companies getting into the data market?

We focus on competitors by market segment. In the traditional market it was probably Cabletron first, Bay second, 3Com third. But in ATM it was FORE [Systems]. In low-end access, it was Ascend. In wide-area switching, it was a Cascade or Nortel. More recently, in this area called interfacing the mainframe, our competitor is IBM.

But as customers move to fewer vendors in the network and perhaps one single partner, then you've got to look not only by product type, but by customer focus. So we now look at service providers, enterprise accounts, small to medium business and, beginning sometime in the next calendar year, the consumer.

In the service provider marketplace, it is some of the large players that you've said and it remains to be seen if Lucent and Nortel would be long-term competitors or partners. It is new players like the Ascend/ Cascade combination, if they make that work. Time will tell, because doing mergers across geographies is extremely high-risk.

In the enterprise accounts, surprisingly enough, it's still Cabletron. They have the most direct sales force. Small to medium business, 3Com and Bay. To the consumer, it's pretty wide open with a whole bunch of different players. We'll go after that through partnering.

What do you think of 3Com today and the merger of 3Com and USR?

[3Com CEO] Eric Benhamou is an excellent leader. He's one of the very best in the industry, and I like him and I trust him. However, I love beating him whenever possible. But I think [the merger] speaks to how rapidly we are pulling away from the rest of the industry. The fact that Eric would do a combination with a company of equal size, halfway across the country, speaks to how much risk he was willing to take on to attempt to stay close to Cisco.

I would argue that it was also as much a focus on Intel as it was Cisco in terms of modems, [network interface cards] — the majority of 3Com's revenue. Intel is probably a much more serious competitor to their future revenue strengths than Cisco is.

Specifically, what are the weaknesses in the combined 3Com/USR story?

Well, let me talk about some of the challenges they have. Mathematically, I've never seen a company that combines two equals end up in a No. 1 or No. 2 position in the computer industry. When Wellfleet and Synoptics combined, they were bigger than Cisco. Three years later, we are three times their size.

The second challenge that they face is determining an innovative product strategy when their market is so spread [out]. There is a lot of difference between products that are not commodities, but close to it, like modems and NICs, vs. systems. They require different expertise, and your ability to combine them in such a way that customers benefit is very, very tricky.

The third thing is that they are missing large product areas. If you look at 13 to 16 areas of products, we are No. 1 and No. 2. in all but a couple of those, where they are missing more than half.

Speaking of companies that merged across geographic distances, what do you think of the changes at Bay Networks under new CEO David House?

They've done a nice job stabilizing the company. But I would draw a parallel to when they first combined. There was a lot of concern then. But about a year later, there was an upturn and all of the articles came out about how they turned the corner and things were going very, very well.

My comment to Andy Ludwick [former Bay CEO] at that time was that you will see waves and you've only been through the first wave. Your real test will be the next 12 months because the hardest part of the acquisition is now to come. The real answer is what Bay looks like two to three years out.

Do you think a company that stumbles like that can come back in customer confidence?

I don't think a company that stumbles that badly can ever come back to the No. 1 or No. 2 player. It's a mathematical challenge, but also in terms of customer confidence. The customers understand that they've still got an East Coast company and a West Coast company, and our customers are picking strate-

See **Chambers,** ***page 134***

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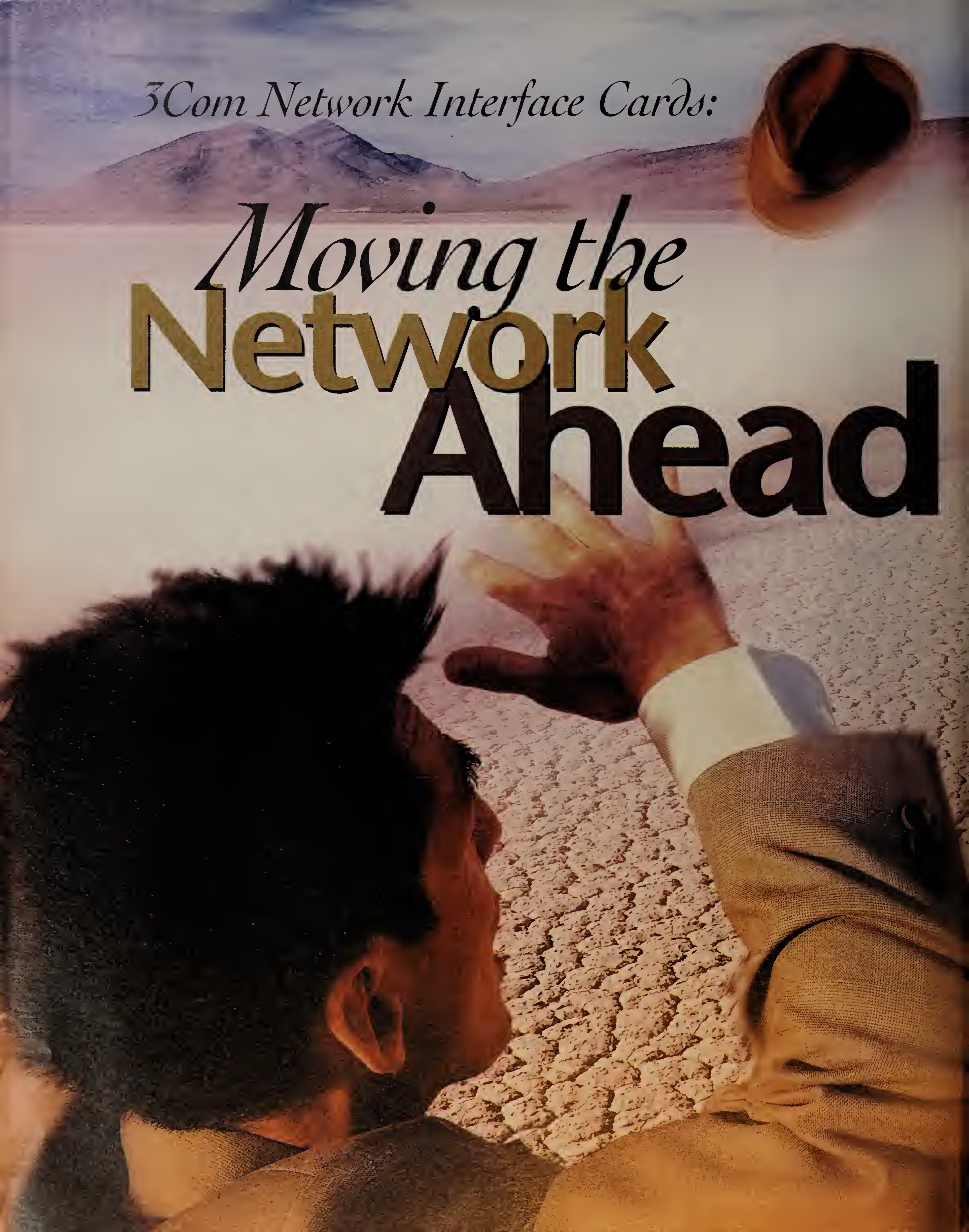

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Briefs

■ **Intel Corp.** *last week went shopping again, acquiring privately held* **Corollary, Inc.,** *an Irvine, Calif., developer of multiprocessor server technology. Financial terms of the acquisition were not disclosed, but Intel officials said the transaction is aimed at accelerating the availability of eight-way servers based on Intel's Pentium Pro processors. Corollary, which will become a wholly owned Intel subsidiary, will focus on designing and developing advanced architectures and products to support future generations of Intel processors.*

■ **Microsoft Corp.** *has released the first beta of the* **Windows NT Server 4.0** *option pack, which features beta versions of Internet Information Server 4.0, Message Queue Server 1.0, Certificate Server 1.0 and Index Server 2.0. Additionally, the package includes Site Server Express, Internet Explorer and Base Camp.*

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■ **Maxspeed Corp.,** *of Palo Alto, Calif., has announced it is reselling* **Prologue Software AG's** *multiuser extension to* **Windows NT,** *a move that will enable Maxspeed's terminal customers to access NT applications. Previously, users of Maxspeed's MaxStation terminals only could access applications running on Unix servers.*

Maxspeed is bundling Prologue's Multinode software, which runs on a Windows NT server or PC, with controller cards that connect the MaxStation terminals to the NT system. Each system supports up to four MaxStations. The hardware and software package, available now, is priced at $650 per terminal.

© Maxspeed: (800) 877-7998

Switch vendor extends QoS beyond ATM

By Jodi Daniels
Minneapolis

A slew of Gigabit Ethernet start-ups will try to steal the high-speed LAN spotlight at this week's NetWorld+Interop 97, but Switched Network Technologies, Inc. (SNT) hopes to turn some of the attention back to ATM.

The start-up will display software for its switches and adapters that extends ATM's ability to deliver guaranteed bandwidth beyond applications written from the ground up, to take advantage of this quality of service (QoS) technology. This means SNT's ATM gear can be used to deliver bandwidth and performance guarantees to applications such as IP-based video and audio streaming programs that are not inherently QoS-aware.

The SNT software runs on the company's EntraLAN ATM devices — a 5.8G bit/sec switch, 155M bit/sec server adapters and 25M and 155M bit/sec desktop computer adapters — and lets customers assign QoS parameters to virtual LANs. The equipment could simultaneously participate in VLANs carrying run-of-the-mill traffic and other VLANs carrying performance-sensitive applications, such as IP-based video and audio streaming.

"One of the most important advantages of ATM is its ability to deliver standards-based quality of service," said Rich Mavrogeanes, vice president of strategic market development at SNT. "Until now, you needed QoS-capable applications to really use ATM's most powerful feature. We're allowing any application to become QoS-capable."

SNT's new QoS VLAN software *will run on the company's existing EntraLAN switch and adapter cards.*

How it works

SNT's software uses the LAN configuration and emulation servers built into the company's ATM switch. When end stations contact the switch, they are directed to join specific preconfigured QoS VLANs, in which the end stations use standard ATM switched virtual circuits based on QoS parameters obtained from the server.

SNT's ATM adapters present a standard Ethernet LANE client to the application, but when operating over a VLAN with a configured QoS, the adapters appear to deliver a dedicated point-to-point Ethernet connection at up to 622M bit/sec.

Customers can use the software approach to have applications request connections that match their requirements. Constant bit rate will guarantee exact bandwidth availability, no matter what happens in the network.

Variable bit rate guarantees bandwidth across a range for real-time and non-real-time applications. Available bit rate allows applications to change their bandwidth usage to take advantage of peaks and valleys in network traffic.

The VLAN QoS software, available as a free upgrade to all EntraLAN products, will begin shipping in the fourth quarter.

© SNT: (612) 519-9700

Get more online:
- **An SNT white paper on desktop ATM**
- **A look at some of the challenges facing ATM pioneer FORE**
- **An overview of one company's campus ATM net**

FIND IT ON FUSION 4112

www.nwfusion.com

FastLane makes mixed Banyan-Microsoft nets more manageable

New offering also includes migration tools.

By Christine Burns
Halifax, Canada

FastLane Technologies, Inc. last week rolled out a product to help administrators centrally manage directory systems in mixed Banyan Systems, Inc. and Microsoft Corp. software environments.

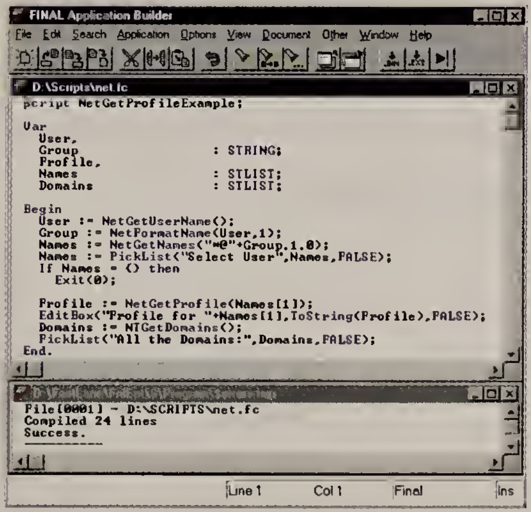
The company traditionally has shipped tools for managing Banyan's StreetTalk directory services, but FastLane's new Enterprise FINAL offering allows an administrator to manage StreetTalk, Windows NT 4.0 domains and Microsoft Exchange directory services from one console. The package includes programs for administering user accounts, access control lists and remote access connections across different directories. It also includes a scripting language that lets companies create their own cross-directory management applications.

Company officials said the product also can be used to migrate StreetTalk accounts to NT or Exchange.

The U.S. Air Force National Guard at the Will Rogers Air Force Base in Oklahoma City has been testing a beta version of Enterprise FINAL. The base is planning a move from a 500-user StreetTalk network to one based on Windows NT 4.0. Sgt. Jack Gallemore, a net administrator at the base, plans to use the product during the migration and for a limited time of coexistence between the two systems.

"You can't beat [Enterprise FINAL] for doing things like migrating users to the new system en masse. Not having to change every detail inside every account manually is going to save us considerable time and money," Gallemore said.

He plans to continue using Enterprise FINAL even after the migration is complete. The software enables him to build more granular administration tools than the NT domain system currently allows.


FINAL Application Builder
File Edit Search Application Options View Document Other Window Help
D:\Scripts\net.fc
Line 1
Col 1
Final
Ins

```
script NetGetProfileExample;

Var
  User,
  Group                   : STRING;
  Profile,
  Names                   : STLIST;
  Domains                 : STLIST;

Begin
  User := NetGetUserName();
  Group := NetFormatName(User,1);
  Names := NetGetNames("*@"+Group,1,0);
  Names := PickList("Select User",Names,FALSE);
  If Names = () then
    Exit(0);

  Profile := NetGetProfile(Names[1]);
  EditBox("Profile for "+Names[1],ToString(Profile),FALSE);
  Domains := NTGetDomains();
  PickList("All the Domains:",Domains,FALSE);
End.
```

```
File[0001] - D:\SCRIPTS\net.fc
Compiled 24 lines
Success.
```

FastLane's Enterprise FINAL *lets network administrators build customized applications for managing specific tasks across directory services.*

Enterprise FINAL also includes two optional features:

- Software that provides a connection between the managed directory services and any Open Database Connectivity-compliant database. This allows companies to create management applications giving administrators a single view of all data.
- Tools that allow network managers to create and automate mail and network user accounts at the same time.

FastLane officials said within the next 12 months Enterprise FINAL will be expanded to support centralized management of Novell Directory Services, Lotus Development Corp.'s Lotus Notes, Netscape Communications Corp.'s Directory Server and NT 5.0 Active Directory-based networks.

By year-end, FastLane is scheduled to ship a Web-based front end to Enterprise FINAL that will allow an administrator to manage multiple directory services from anywhere on the Internet or corporate intranet.

Enterprise FINAL is available now and ranges in price from $6 to $14 per user account. The development tools for building customized directory management applications cost $995.

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CA bolsters NT-based backup offering

ARCserve 6.5 for NT features remote administration, security and compression.

By Christine Burns
Islandia, N.Y.

Computer Associates International, Inc. (CA) last week released an upgrade to its ARCserve product designed to ease the management of backup and recovery processes on distributed Windows NT networks.

Among the new features of ARCserve 6.5 for NT is the ability to install remote backup servers across a network simultaneously. Additionally, the product includes tools for managing distributed ARCserve for NT machines centrally.

These remote management capabilities were a big draw for Tiger Leaf Communications, Inc., a Web site development firm in Pittsburgh.

"We've got four copies of ARCserve running on different parts of the net, and these new features allow me to sit at my desk and manage all of them," said Tod Beardsley, a systems administrator. "That's insanely handy."

Another ARCserve 6.5 for NT feature that makes the product suitable for enterprise networks is its ability to back up data from machines running different operating systems.

"We have over 3 gigabytes of storage sitting on Unix, NT and NetWare machines, and this product handles it all," said Michael Warchut, a systems administrator with Interloc Corp., in Greenfield, Mass.

The upgraded ARCserve software contains end-to-end data encryption and compression tools for sending backup data securely and quickly over corporate networks.

Beardsley was pleased with the data encryption addition because one of his firm's backup NT servers is at an Internet service provider site. "I am not sure of the level of security they have over there, and it's good to know that I can make sure nobody takes a peek at my backup data," he said.

ARCserve 6.5 for NT also has added support for Microsoft SQL Server database, which customers can use for tracking archived data instead of ARCserve's proprietary database.

CA is shipping several new and upgraded add-on features, including facilities for automated data migration between backup media, the ability to recover data from multiple remote locations and tools to back up data from mainframe systems.

Pricing for ARCserve 6.5 for NT begins at $695 for a single-server edition. An enterprise edition that provides backup and restoral services for an unlimited amount of NT servers costs $1,395.

The new add-ons range in price from $395 for disaster recovery to $6,995 for mainframe backup.

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WHAT'S NEW IN ARCSERVE 6.5 FOR NT

- Remote installation to multiple NT machines
- End-to-end intelligent data encryption
- Centralized database information and reporting
- Support for Microsoft SQL Server database
- Integration with Unicenter TNG
- Mainframe backup option
- Optical library support
- Optional data migration option

Sun doubles the power of its server clustering technology

Full Moon products also let servers share databases.

By Marc Songini
Mountain View, Calif.

Sun Microsystems, Inc. last week detailed the second phase of its Full Moon product strategy for clustering enterprise servers.

The company said it will roll out Version 2.0 of its Sun Cluster software, as well as a new interconnect switch.

Together these products will enable customers to double the number of Sun servers they can unite in a cluster — from two to four.

These four-server clusters will improve availability of server resources by providing access to up to 256 processors, 256 I/O channels and 256G bytes of memory.

Any Sun server — from the single-processor Enterprise 1 to the top-of-the-line Enterprise 10000 — can be clustered together. The boxes can be separated by a distance of up to two kilometers and, depending upon configuration, a cluster can support thousands of clients.

The company introduced Full Moon in March, claiming the initiative would bring the full benefits of clustering to its Solaris-based servers.

Meanwhile, rival Microsoft Corp. and others have been pushing server cluster solutions of their own, recognizing that customers are demanding more reliable and higher performance servers.

Sun's updated clustering software moves beyond the ability of one server being able to take over for a failed one.

The software lets more than one server in a cluster share access to a single database and allows only limited load balancing.

The company claims many of its Solaris-based applications can be tweaked for use with Sun Cluster 2.0.

Customers can cluster their Sun servers two ways: via the newly extended 1G bit/sec scalable coherent interface (consisting of a host adapter card, cable and an optional switch) or with a 100M bit/sec Fast Ethernet connection.

Sun's offering is making the company's servers more competitive with mainframes, said Jim Garden, director of technical services at Technology Business Research in Hampton, N.H.

Sun servers clustered via Full Moon technology are ideally suited for running database programs and decision support applications, he said.

Sun eventually plans to offer eight-node cluster technology and Java browser-based cluster monitoring and management tools. Some of this technology could be released as early as next spring.

Sun Cluster 2.0 ships on Oct. 22. Pricing starts at $2,000.

©Sun: (800) 821-4643

YAGO raises switch bar to Layer 4

Start-up rolls out Multilayer Switching Router Gigabit Ethernet devices.

By Jodi Daniels
Sunnyvale, Calif.

Start-up YAGO Systems, Inc. last week made its product debut with a pair of Gigabit Ethernet switching routers.

As expected, the devices deliver wire-speed routing at gigabit rates and application-level control through Layer 4 switching (*NW*, Sept. 15, page 1).

YAGO's Multilayer Switching Router (MSR) family, which this week will be on display at NetWorld+Interop 97, extends beyond traditional Layer 3 routing functionality by switching application flows at Layer 4, the transport layer of the Open Systems Interconnection stack. This allows the devices to make switch decisions — at wire speed — based on the applications a business is using.

Layer 4 switching uses TCP session-related information in HTTP or File Transfer Protocol to make intelligent switching decisions. That is different from basic Layer 2 switches, which transfer data between ports based on the destination address of individual packets. It also differs from Layer 3 switches, which perform routing functions at wire speed.

The key to YAGO's Layer 4 functionality is its RouterCore Application Specific Integrated Circuit. This allows MSR devices to read deep into packets.

YAGO's Multilayer Switching Routers

Product	Pricing for fully loaded 10M/100M bit/sec chassis	Pricing for fully loaded 1G bit/sec Ethernet chassis	Availability
MSR 8000	$43,995	$44,995	Q1 1998
MSR 16000	$93,995	$96,995	Q2 1998

*All 10/100 ports cost $595, and all Gigabit Ethernet ports are priced at $2,495.

"Layer 4 switching is the ability to switch packets at wire-speed based on Layer 3 and 4 information," said P. G. Menon, YAGO's director of marketing. "If you are running a mission-critical application like SAP, you can configure the backbone so that you allocate 30% of your bandwidth exclusively to SAP."

Switch specifics

YAGO's flagship product is the 16-slot MSR 16000, which can route more than 30 million packet/sec. The device can be configured with as many as 120 10M/100M bit/sec Ethernet ports, 30 Gigabit Ethernet ports or a mix. It supports 250,000 routes and more than four million Layer 4 application flows.

YAGO also announced the eight-slot MSR 8000 chassis, which can route more than 15 million packet/sec. It can be configured with up to 56 10M/100M bit/sec Ethernet ports, 14 Gigabit Ethernet ports or a mix. The MSR 8000 supports 250,000 routes and two million Layer 4 application flows. Each box is well-suited for the backbone or wiring closet, depending on how the devices are configured.

YAGO also has alluded to a future product — dubbed the MSR 32000 — which will route more than 60 million packet/sec. This device is expected to ship in the second half of 1998.

The MSR family is priced at $595 per 10M/100M bit/sec Ethernet port and $2,495 per Gigabit Ethernet port. The MSR 8000 will ship in the first quarter of 1998; the MSR 16000 will be available in the second quarter of 1998.

©YAGO: (408) 774-2900

In-Site

ScottishTelecom takes high road with NCs

By John Cox
Glasgow, Scotland

A telecom company here is turning to Sun Microsystems, Inc.'s network computers (NC) as its main desktop platform, a move designed to help the carrier respond faster to market changes.

On November 1, ScottishTelecom will start deploying about 100 Sun JavaStations in its call center, which fields residential customer orders and inquiries. Later, more NCs will be used in a new call center that focuses on business accounts.

The three-year-old company last fall decided to offer residential phone service. "We needed a new network and applications architecture to build these services," said Norrie Craig, ScottishTelecom's information systems manager. "We wanted a flexible and open architecture to let us launch new products quickly."

The NC network will enable ScottishTelecom to quickly deliver new Java applets to end users simply by plopping the new programs onto a few servers.

NCs are designed to download HTML and Java applications, run Java locally and use a server for storing files and data. Optional software lets NCs connect with applications running on Windows or Unix servers. ScottishTelecom's existing call center, with its One Touch Customer Care (OTCC) application, was the main pilot test for the JavaStations. Software engineers rewrote the application in Java to run on the NCs.

According to Craig, the JavaStations and their companion Sun Netra j servers have proven to be highly reliable. JavaStation performance at start-up was slow at first, but Craig discovered the NCs were bogging down because of the new Java OTCC client. "We ended up with one huge applet to start with for the OTCC user," he said. "Initially it took 2 or 3 minutes to download the client."

SCOTTISHTELECOM CALLS ON SUN'S NETWORK COMPUTER

The telecommunications company's JavaStation pilot project revealed the following:

- The NC was reliable and machine performance was acceptable.
- A new Java front end-to-customer-service application had to be rewritten as much smaller applets to cut download time from 2 to 3 minutes to 20 seconds.
- Sun Netra j servers, which boot the JavaStations, delivered good performance but were hard for the telcom company's Unix experts to integrate with Novell Directory Services.
- Sun's HotJava browser, in beta release, provided minimal functions initially.
- Delays in the U.K. release of third-party middleware and management software put deployment behind.

Developers rewrote the client as a set of much smaller applets, which load in about 20 seconds. The JavaStation screen refresh, which at first was so slow users could actually see the new screen scrolling up, now takes just 2 to 3 seconds.

At first, Sun's HotJava browser offered very basic functions and was plagued by problems. GIF files, for example, did not work well. In subsequent releases, HotJava has been improved, but ScottishTelecom may opt for a different brand.

Despite these issues, JavaStations remain a viable solution for the carrier. "We want to be able to control our desktop environment from the center," Craig said. "Java and network computers are both still central to our strategy." ■

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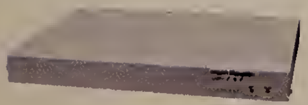

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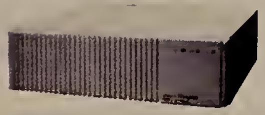

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WIRED WINDOWS

Don't abdicate control of software changes

My past two columns have been about electronic software distribution (ESD) — direct-to-the-desktop Internet-based installation of new software, patches and upgrades. I think ESD will become the regular channel for software distribution within two years, so I wanted to urge you to get on top of the technology before your end users leave you behind.

Dave Kearns

Needless to say, I was surprised by the e-mail I received from several network administrators who said they preferred to stay totally out of the loop and leave software installation up to the end users. Let's look at why this is a bad idea.

When a new employee arrives at your company, it's not likely you'll go to the person's desk with a CD or diskettes to install software.

The majority of new installs are done by purchasing another license for the software your company uses, then setting up the software by running a network-based installation program.

The trend also is to install the applications and support libraries on network storage devices with, at most, a few configuration files stored locally on the user's machine.

Under Windows 95 or NT Workstation, you even can keep an end user's registry files (an individual's configuration) stored on the network.

This saves you time when troubleshooting and also allows end users to move from PC to PC while maintaining the same computer desktop look and feel.

Each of these changes and controls you institute will cut down on the number of help desk calls you get. It also will increase the network's security by giving viruses less chance to sneak into your company's systems.

If you now decide that your end users, with ESD, can handle their own updates, upgrades and patches, you also better start lobbying for a bigger help desk budget, better antivirus software, more disk space and more bandwidth for your Internet connection.

Take Windows applications, for example. They almost all use some modules, such as Dynamic Link Libraries (DLL), which also are used by other programs. When installing new applications or updating old ones, it sometimes seems you have to walk a tightrope in deciding which versions of these shared libraries to use.

I'm sure you all have faced the situation of a new application overwriting a DLL with a different version, causing other software to function improperly.

Would you rather undertake to solve this problem with a single installation of the software or have everyone on the network make their own "best guess" as to which version of a DLL is correct? How many phone lines does your help desk have?

To minimize the problems that user-installed software can cause, you'll probably want to give users their own software area or at least their own area for support modules and configuration information.

Today's Windows programs can take large amounts of disk space — 100M bytes or more is typical for office productivity applications. Even if there are only 50 users, you could easily use an additional 4G bytes of disk space for each application.

Oh, and did I mention bandwidth? Fifty people vs. one person receiving Microsoft's 40M byte-to-90M byte update file — you do the math.

ESD can work for you, but not if you abdicate control to end users.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of the week

Novell has released a list of products that are, or soon will be, year 2000 compliant. Check it out at www.novell.com/p2000/comply.html.

QUICK TAKE: ROUTER ACCELERATOR GIGAMODULE

Plaintree revving up a fast router engine

Plaintree Systems, Inc. last week announced it will support integrated Layer 3 switching in its gigabit backbone switch.

The company's new Router Accelerator (RA) GigaModule – which has no external ports – is a fast IP forwarding engine that slides into Plaintree's WaveSwitch 9200 chassis. The module works in conjunction with external routers that support protocols such as the Interior Gateway Routing Protocol, Routing Information Protocol and Open Shortest Path First.

Working with a locally connected router, the module switches up to 1.5 million packet/sec directly to local destinations. By itself, the WaveSwitch 9200 delivers up to 24 million packet/sec of Layer 2 throughput. Customers can stuff the WaveSwitch 9200 with as many as four RA modules to add redundancy and up to 6 million packet/sec of Layer 3 capacity.

The RA GigaModule costs $14,995 and will be available for shipment in January. The WaveSwitch 9200 is already available. Pricing starts at $9,995.

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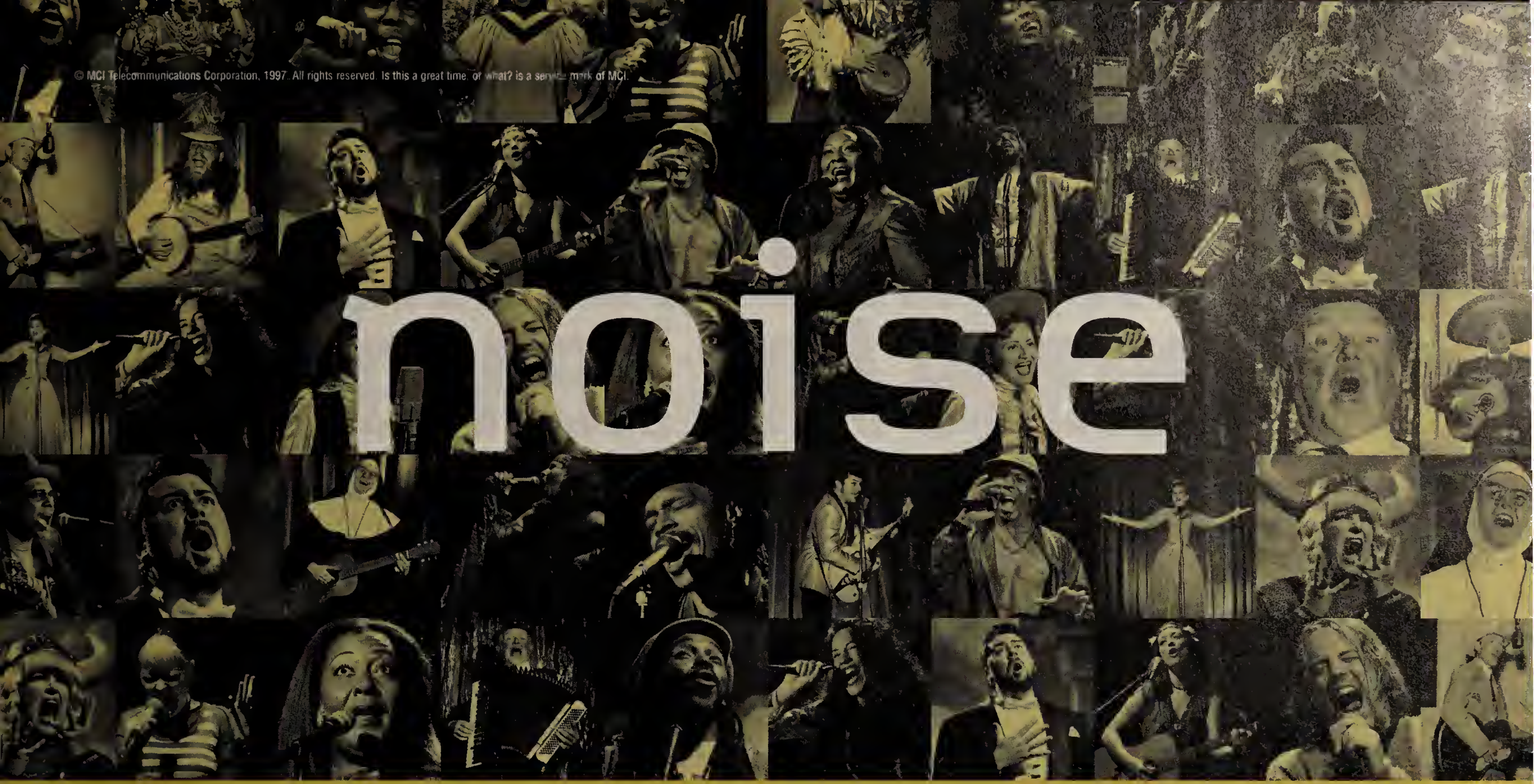

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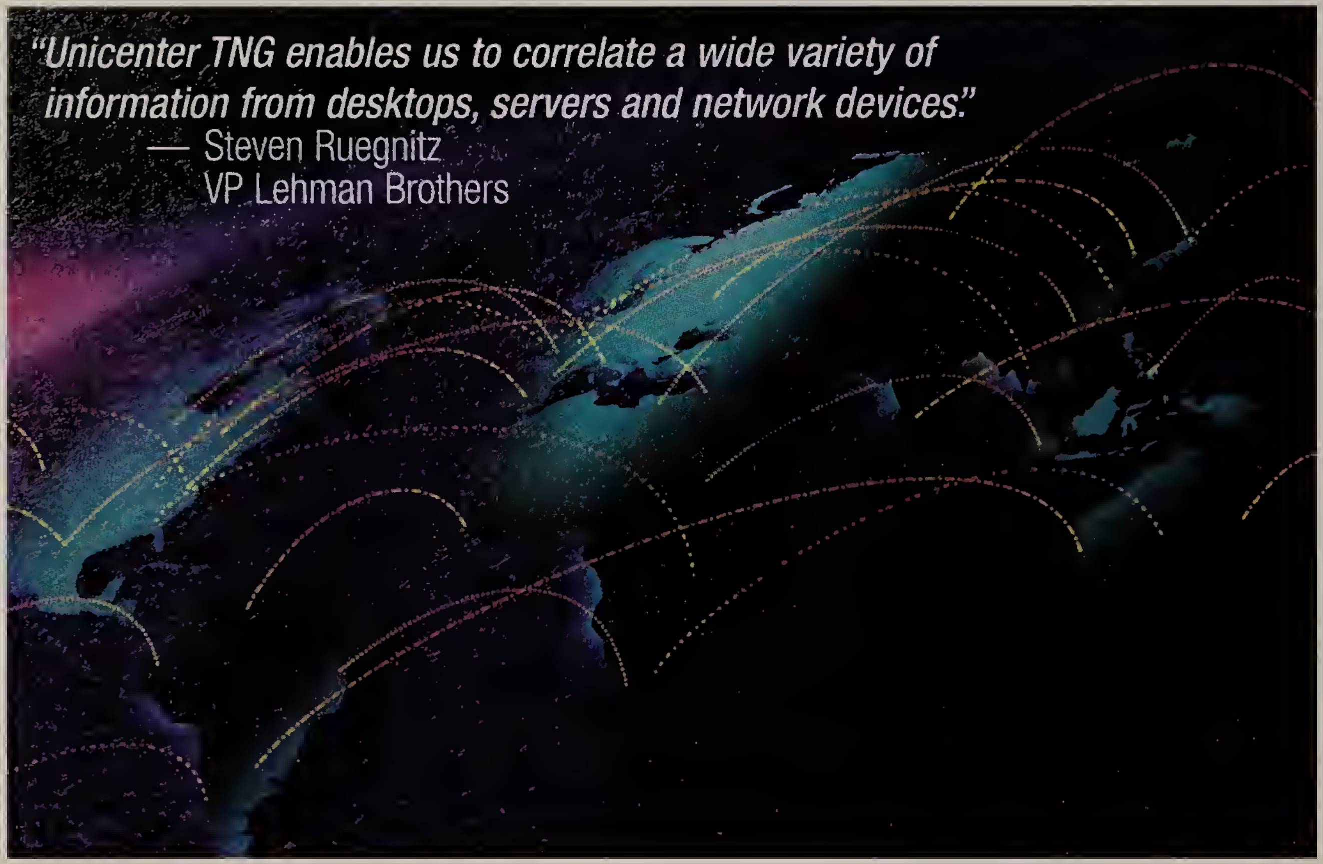

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Form: 9702

1 What is the principal business activity at your location? (check one only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consulting (Independent)*
16. ☐ Carriers/Interconnects
17. ☐ Internet Service Provider (ISP)
18. ☐ Manufacturing (Computer/Communications/OEM)
19. ☐ Resellers of Computer/Network Products (VARs, VADs)
20. ☐ Systems/Network Integrators*
21. ☐ Distributors (Computer/Communications)*
22. ☐ Other *(please specify)*______________

***Please complete form based on largest client.**

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Network Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, CIO, Systems Management
5. ☐ Internet/Intranet Management/Webmaster
6. ☐ Engineering Management
7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
8. ☐ Consultant (Independent)
9. ☐ Other *(please specify)*______________

3 What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please print the appropriate number code in the box next to each product category. Please complete ALL categories A-M.)

1. $50 Million or more
2. $25 Million to $49.9 Million
3. $10 to $24.9 Million
4. $1 to $9.9 Million
5. $100,000 to $999,999
6. $50,000 to $99,999
7. Under $50,000
8. None of the above

A ☐ Large Systems *(Mainframes/Minis)*
B ☐ Desktops *(Micros/Laptops/Workstations)*
C ☐ Servers
D ☐ LANs
E ☐ WAN Equipment
F ☐ Carrier Services
G ☐ Internetworking
H ☐ Internet
I ☐ Intranet
J ☐ Remote Access
K ☐ Peripherals
L ☐ Software
M ☐ Service/Support

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 2. ☐ 50 - 99 3. ☐ 20 - 49 4. ☐ 10 - 19 5. ☐ 2 - 9 6. ☐ 1 7. ☐ None

5 What is the total number of Servers/Clients/LANs installed/planned at your location/in your entire organization? (Check one box in each column)

SERVERS			CLIENTS			LANS		
At Location A		Entire Org. B	At Location C		Entire Org. D	At Location E		Entire Org. F
☐	1. 50,000+	☐	☐	1. 50,000+	☐	☐	1. 50,000+	☐
☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐	☐	2. 10,000 to 49,999	☐
☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐	☐	3. 1,000 to 9,999	☐
☐	4. 100 to 999	☐	☐	4. 100 to 999	☐	☐	4. 100 to 999	☐
☐	5. 50 to 99	☐	☐	5. 50 to 99	☐	☐	5. 50 to 99	☐
☐	6. 10 to 49	☐	☐	6. 10 to 49	☐	☐	6. 10 to 49	☐
☐	7. 1 to 9	☐	☐	7. 1 to 9	☐	☐	7. 1 to 9	☐
☐	8. none	☐	☐	8. none	☐	☐	8. none	☐

6 What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. Involvement (check ALL that apply)
1. ☐ Create Network Strategy
2. ☐ Recommend/Specify
3. ☐ Approve
4. ☐ Evaluate
5. ☐ Determine the need
6. ☐ None

7 What is the estimated number of employees at your location/in entire organization? (check one in each section)

A. At your location:
1. ☐ Over 20,000
2. ☐ 10,000 - 19,999
3. ☐ 5,000 - 9,999
4. ☐ 2,500 - 4,999
5. ☐ 1,000 - 2,499
6. ☐ 500 - 999
7. ☐ 499 or less

B. Entire organization:
1. ☐ Over 20,000
2. ☐ 10,000 - 19,999
3. ☐ 5,000 - 9,999
4. ☐ 2,500 - 4,999
5. ☐ 1,000 - 2,499
6. ☐ 500 - 999
7. ☐ 499 or less

8 Please indicate the products/services that you are currently involved in purchasing or plan to purchase: (Check ALL that apply)

A. Currently involved in purchasing **B. Plan to purchase**

INTERNET/INTRANET
A B
☐ 01. ☐ Internet Services
☐ 02. ☐ Firewalls/Security/Encryption
☐ 03. ☐ Internet Web Servers
☐ 04. ☐ Intranet Web Servers
☐ 05. ☐ TCP/IP Software
☐ 06. ☐ Management/Monitoring Software
☐ 07. ☐ Push Technology
☐ 08. ☐ Web Browsers
☐ 09. ☐ Intranet Applications/Groupware
☐ 10. ☐ Search/Retrieval Products (web crawler)
☐ 11. ☐ Internet Development Tools (JAVA, ActiveX, etc.)
☐ 12. ☐ Electronic Commerce Tools
☐ 13. ☐ Internet Telephony

LOCAL-AREA NETWORKS
A B
☐ 14. ☐ Local-Area Networks
☐ 15 ☐ Network Operating System Software
☐ 16. ☐ Servers
☐ 17. ☐ Print Servers
☐ 18. ☐ ATM Switches
☐ 19. ☐ Token-Ring Switches
☐ 20. ☐ Ethernet Switches
☐ 21. ☐ Fast Ethernet
☐ 22. ☐ Gigabit Ethernet
☐ 23. ☐ IP Switches
☐ 24. ☐ LAN Storage/Backup
☐ 25. ☐ Optical LAN Storage/Backup
☐ 26. ☐ Disk LAN Storage/Backup
☐ 27. ☐ Tape LAN Storage/Backup
☐ 28. ☐ RAID LAN Storage/Backup
☐ 29. ☐ Network Test/Diagnostic Tools
☐ 30. ☐ Cables, Connectors, Baluns
☐ 31. ☐ UPS
☐ 32. ☐ Network Interface Cards
☐ 33. ☐ SNMP Network Management

INTERNETWORKING
A B
☐ 34. ☐ Routers
☐ 35. ☐ Hubs
☐ 36. ☐ Intelligent Hubs
☐ 37. ☐ Stackable Hubs
☐ 38. ☐ Bridge/Router
☐ 39. ☐ Bridges
☐ 40. ☐ Gateways
☐ 41. ☐ Concentrators/Repeaters

COMPUTERS/PERIPHERALS
A B
☐ 42. ☐ Network Computers
☐ 43 ☐ Laptops/Notebooks/Sub-Notebooks
☐ 44. ☐ Micros/PCs
☐ 45. ☐ Minis
☐ 46. ☐ Mainframes
☐ 47. ☐ Workstations
☐ 48. ☐ Printers/Network Printers
☐ 49. ☐ CD-ROM
☐ 50. ☐ Fax/Modem Boards
☐ 51. ☐ Graphics/Multimedia/Audio/Video Boards
☐ 52. ☐ Memory/Chips/Boards/Cards

REMOTE/WIRELESS COMPUTING
A B
☐ 53. ☐ Remote Access Products
☐ 54. ☐ Remote Access Services
☐ 55. ☐ PDAs
☐ 56. ☐ PCMCIA Devices
☐ 57. ☐ Wireless Data Services
☐ 58. ☐ Wireless Data Equipment
☐ 59. ☐ Cellular Equipment & Services

SOFTWARE/APPLICATIONS
A B
☐ 60. ☐ Network Management
☐ 61. ☐ Systems Management
☐ 62. ☐ Security
☐ 63. ☐ Communications Software
☐ 64. ☐ Terminal Emulation
☐ 65. ☐ Operating Systems
☐ 66. ☐ Applications Development Tools
☐ 67. ☐ Database Management/RDBMS
☐ 68. ☐ Groupware
☐ 69. ☐ Workflow
☐ 70. ☐ EDI
☐ 71. ☐ E-mail
☐ 72. ☐ Desktop Video Conferencing
☐ 73. ☐ Imaging
☐ 74. ☐ Suites/Server Suites (Back Office, etc.)
☐ 75. ☐ Middleware
☐ 76. ☐ Document Management
☐ 77. ☐ Site Metering Tools
☐ 78. ☐ Computer Telephony Integration (CTI)
☐ 79. ☐ Data Warehousing

WIDE-AREA NETWORK EQUIPMENT & SERVICES
A B
☐ 80. ☐ Modems
☐ 81. ☐ Asynchronous Transfer Mode (ATM)
☐ 82. ☐ Frame Relay Equipment/Services
☐ 83. ☐ ISDN Equipment & Services
☐ 84. ☐ FT-1/T-1/T-3 Multiplexers/Services
☐ 85. ☐ DSL Services/Products
☐ 86. ☐ SONET
☐ 87. ☐ Inverse Multiplexers
☐ 88. ☐ SMDS
☐ 89. ☐ Diagnostic/Test Equipment
☐ 90. ☐ DSU/CSU
☐ 91. ☐ VSAT/Satellite
☐ 92. ☐ PBXs
☐ 93. ☐ Voice Mail/Response
☐ 94. ☐ Videoconferencing
☐ 95. ☐ Leased Lines
☐ 96. ☐ Switched Data
☐ 97. ☐ Virtual Networks
☐ 98. ☐ Outsourcing/Systems Integration Services
☐ 99. ☐ Education/Training Services

☐ 00. ☐ None of the above (1 - 99)

9 Please indicate the platforms that are currently installed/planned:

(Check ALL that apply) **A. Currently installed** **B. Planned for purchase**

NETWORK PROTOCOLS
A B
☐ 01. ☐ TCP/IP
☐ 02. ☐ IPv6
☐ 03. ☐ SNA
☐ 04. ☐ DECnet
☐ 05. ☐ Novell IPX/SPX
☐ 06. ☐ APPC/APPN/LU 6.2
☐ 07. ☐ NETBIOS
☐ 08. ☐ AppleTalk
☐ 09. ☐ NFS
☐ 10. ☐ Other *(please specify)*______________

LAN ENVIRONMENT
A B
☐ 11. ☐ Gigabit Ethernet
☐ 12. ☐ Switched Ethernet
☐ 13. ☐ Fast Ethernet (100 Megabit Ethernet)
☐ 14. ☐ Ethernet
☐ 15. ☐ ATM
☐ 16. ☐ Token Ring/Token Ring Switching
☐ 17. ☐ IP Switching
☐ 18. ☐ FDDI
☐ 19. ☐ 100Base-T
☐ 20. ☐ 10Base-T
☐ 21. ☐ LocalTalk
☐ 22. ☐ Fibre Channel
☐ 23. ☐ 100vg Any LAN
☐ 24. ☐ Other *(please specify)*______________

NETWORK OPERATING SYSTEM
A B
☐ 25. ☐ Windows NT
☐ 26. ☐ Windows NT/Advanced Server
☐ 27. ☐ Novell IntranetWare
☐ 28. ☐ Novell (NetWare 4.X)
☐ 29. ☐ Novell (NetWare 2.X, 3.X)
☐ 30. ☐ Microsoft (LAN Manager)
☐ 31. ☐ LocalTalk (AppleTalk)
☐ 32. ☐ Banyan (VINES)
☐ 33. ☐ IBM (LAN Server)
☐ 34. ☐ Artisoft (LANtastic)
☐ 35. ☐ Other *(please specify)*______________

COMPUTER OPERATING SYSTEM
A B
☐ 36. ☐ NT Server
☐ 37. ☐ NT Workstation
☐ 38. ☐ Unix/Xenix/AIX
☐ 39. ☐ Solaris
☐ 40. ☐ Windows
☐ 41. ☐ Windows 95
☐ 42. ☐ Windows 97
☐ 43. ☐ DOS
☐ 44. ☐ OS/2/OS/2 Warp
☐ 45. ☐ IBM MVS/VM/VSE
☐ 46. ☐ Digital VMS
☐ 47. ☐ Macintosh
☐ 48. ☐ Other *(please specify)*______________

☐ 49. ☐ None of the above (1-48)

10 Which of the following Servers/Clients do you have installed/planned at your location? (check ALL that apply in each column)

		A. Servers	B. Clients			A. Servers	B. Clients
01.	Power PC	☐	☐	07.	486	☐	☐
02.	Power Mac	☐	☐	08.	386	☐	☐
03.	Mac Other	☐	☐	09.	286	☐	☐
04.	Multiprocessor Servers	☐	☐	10.	Risc	☐	☐
05.	P6/PII	☐	☐	11.	Alpha	☐	☐
06.	Pentium/Pentium Pro	☐	☐	12.	Other	☐	☐

11 Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Mainframes (Large Scale) Installed/Planned
1. ☐ IBM
2. ☐ Amdahl
3. ☐ Cray
4. ☐ Hitachi
5. ☐ Unisys
6. ☐ Other ______________

B - Minis (Midrange) Installed/Planned
1. ☐ IBM RS6000
2. ☐ IBM AS400
3. ☐ Digital
4. ☐ Tandem
5. ☐ Unisys
6. ☐ AT&T GIS
7. ☐ H-P
8. ☐ Data General
9. ☐ Other ______________

C - Workstations Installed/Planned
1. ☐ Sun Microsystems
2. ☐ Silicon Graphics
3. ☐ Digital
4. ☐ H-P
5. ☐ IBM
6. ☐ Other ______________

12 What is the estimated gross annual revenue of your entire company/institution? (check one only)

01. ☐ $20 billion or more
02. ☐ $10 billion to $19.9 billion
03. ☐ $1 billion to $9.9 billion
04. ☐ $500 million to $999.9 million
05. ☐ $100 million to $499.9 million
06. ☐ $50 million to $99.9 million
07. ☐ $10 million to $49.9 million
08. ☐ $5 million to $9.9 million
09. ☐ $4.9 million or less
10. ☐ None of the above

13 For which areas outside of North America do you have purchase influence? (check ALL that apply)

1. ☐ Europe 2. ☐ Asia 3. ☐ South America 4. ☐ Australia 5. ☐ Middle East 6. ☐ None

B1097

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Internetworks

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Briefs

NetSuite Development *has raised* **$6 million** *in second-round financing, $2 million of which came from Cisco Systems, Inc.*

Another big investor in the network design company is Fidelity Capital, the venture arm of Fidelity Investments Institutional Services Company, Inc.

The second-round financing will be used to fund additional product development activities and continued expansion of distribution channels, NetSuite said.

Candle Corp. *introduced Candle Management Server (CMS) for OS/400, a* **problem detection and correction** *product for IBM AS/400 systems.*

OS/400 CMS provides graphical user interface-based, automated system processes, which monitor multiple system conditions and respond with actions when those conditions occur.

IBM's AS/400 *has a new manager, Candle's CMS for OS/400, a problem-detection and correction product.*

OS/400 CMS also checks the results of those actions, notifies personnel and escalates notifications.

OS/400 CMS functionality replaces IBM's Automation Center/400 product, Candle said. Pricing for OS/400 CMS ranges from $15,000 to $25,000. It is available now.

IBM *last week announced the release of a* **64-bit Unix** *server package.*

Based on IBM's recently developed PowerPC RS64 Reduced Instruction Set Computing chips and 64-bit software products, the RS/6000 Model S70 has double the speed of its predecesssor and is targeted for use in clus-tering and systems management The server scales four, eight or 12 ways. The operating system is the new AIX Version 4.3.

Shiva, 3Com enter virtual private network fray

Shiva adds Internet to remote access offerings.

By Tim Greene
Bedford, Mass.

Shiva Corp. is making the leap from providing traditional dial-up remote access to developing gear that lets remote users tap corporate networks over the Internet.

The company this week will announce VantagePath, a set of hardware, software and services designed to establish IP virtual private networks (VPN) over the Internet or private IP networks.

VantagePath incorporates IP tunneling technology, which encrypts and encapsulates IP packets for transport across IP networks. It also uses IP Security encryption as a way to make public IP networks safe for sensitive corporate data.

VantagePath hardware consists of gear for corporate sites and carrier networks. VantagePath consulting services are designed to help customers set up their own corporate VPNs.

VantagePath looks good enough on paper for Polaroid Corp. to give it a try. The company plans to start phasing in VantagePath by the end of the month, with dial-up users going over the Internet to access the corporate network.

Even so, trusting corporate information to the Internet can be worrisome. "We're actually petrified," said David Margossian, telecommunication consultant for corporate voice and data planning at Polaroid in Cambridge, Mass.

Get more info online:

- **A look at other hardware-based VPNs**
- **Articles on Microsoft's and Novell's software-based VPN efforts**

www.nwfusion.com

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His major concern is security, but Shiva's track record for supplying hardware for Polaroid's current dial-up network gives him some degree of confidence, Margossian said.

If it proves itself, the VPN could save Polaroid money on direct-dial remote access, as well as simplify support for remote users, Margossian said. Rather than being outfitted with security software to directly access the Polaroid network, clients will need Microsoft Corp.'s Windows 95 to support tunneling. Microsoft has agreed to integrate standardized tunneling into Windows 95 as soon as a standard is approved.

Let Shiva do it

Shiva's VantagePath Network Services offers virtual private networking, including:

- Design consultation
- Customizing and deployment
- Management

With VantagePath, users of Polaroid's worldwide network will dial in to a local Internet service provider's point of presence and connect over the 'Net to a VantagePath Network Gateway at the edge of the Polaroid network.

The Gateway hardware and software will terminate the IP tunnel, decrypt the payload and give the remote user access inside the corporate network.

The initial release of the five-slot Network Gateway has a single 10/100 Ethernet interface with a routing and encrypting engine. In a typical configuration, it will sit behind the corporate firewall and take in tunneled traffic, terminate the tunnel and forward traffic to the LAN.

VantagePath also includes VantagePath Access Concentrator, a dial-up concentrator for ISPs, developed with Northern Telecom, Inc. A VantagePath network management system will be announced later this year.

VantagePath Network Sevices will include design, installation and maintenance of IP VPNs.

The Gateway costs $12,500 for the chassis and client, which gives users the ability to terminate 100 tunnels.

© Shiva: (617) 270-8810

3Com says off-the-shelf boxes, new software is all it takes.

By Tim Greene
Santa Clara, Calif.

3Com Corp. this week will join the IP virtual private network (VPN) party by announcing its vision of how to piece these networks together — a strategy based on enhancing gear it already makes with new software.

3Com's new architecture, called 3Access VPN, enables dial-up users to secure traffic over the Internet for access to corporate networks.

In general, the architecture calls for users to establish an IP tunnel, which is a stream of encrypted IP packets, through the Internet or a private IP network and then terminate the tunnel to deliver the IP payload.

Corporate networks can buy into the architecture by having remote users dial up their Internet service providers using 3Com access gear that has been enhanced to encrypt traffic using the IP Security (IPSec) encryption and tunneling protocol.

At the corporate central site, a 3Access Secure Remote Authentication Dial-In User Service server would authenticate the user. Then a combination of SuperStack II and NETBuilder routers with tunneling and IPSec software would establish a tunneling session and decrypt packets as they come in.

The user view

Craig Horrocks, a principal with T&C Consulting in Sacramento, Calif., said he is weighing whether to recommend such a network to a department of the State of California to augment its current direct-dial network.

Horrocks said a 3Com supported VPN could save money in two ways. First, the cost of long-distance phone calls would be replaced by local calls to an ISP. Second, because the modem being called would be within the ISP network, the state would not have to staff a help desk to deal with late-night callers who have trouble connecting; it would be the ISP's problem.

"If you can secure it, there is good reason to look at it," Horrocks said.

While he did not doubt the effectiveness of the security measures, he noted that the tunneling has not been standardized. "That's my only concern about the security. You have to be sure you're not painting yourself into a hole," Horrocks said.

3Com introduces a unique element to tunneling with a feature it calls tunnel switching. This feature provides additional security within the corporate central site, the company said.

3COM'S VPN APPROACH

3AccessVPN, 3Com's virtual private network system, supports several models of corporate VPNs:

- ▶ Outsourcing all corporate remote access to a VPN provider.
- ▶ Replacing leased lines with IP networks, including the Internet.
- ▶ Establishing dial-up access points to the corporate IP VPN.

With tunnel switching, a tunnel session that is terminated behind the corporate firewall can be re-established inside the corporate IP network. This secures the datastream from prying eyes within the corporate network.

The 3Access architecture also includes scenarios that rely on service providers to install tunneling gear in their networks and offer secure VPN services.

All of the hardware necessary to build 3Access VPNs exists today. The software will be introduced in the first quarter of next year. Pricing was unavailable.

3Access hardware is a blend of the former U.S. Robotics product line with the 3Com line. It relies on the Total Control Enterprise Network Hub, SuperStack II switches and NETBuilder II routers, as well as a variety of modems or ISDN terminal adapters.

© 3Com: (408) 764-5000

Cisco boosts management expertise, offers enhanced apps

Assured Network Services plan offers integrated Network management based on 'Net standards and technologies.

By Rebecca Sykes and Jim Duffy
San Jose, Calif.

Cisco Systems, Inc. has rolled out enhanced network management applications and a new initiative to tightly integrate its disparate management products.

The new products and strategy are precursors to Cisco's move to a user-based management model in which policies, directory services and dynamic addressing are integral to the management process.

"We're shifting our focus to a user perspective," said Bill Ahlstrom, director of marketing for enterprise network management at Cisco.

Cisco's assured network services lineup

- ▶ Cisco Enterprise Accounting for NetFlow 2.0: Features reports designed to provide a granular picture of the network.
- ▶ Cisco Enterprise Accounting for ISDN 2.0: Monitors ISDN usage and generates Web-based reports.
- ▶ CiscoWorks for Switched Internetworks 2.1: Performs multithreaded discovery, user-based policy tracking, ATM LAN Emulation client and server monitoring, and enhanced traffic monitoring.

The new initiative, called Assured Network Services (ANS), is a commitment by Cisco to offer integrated network management applications based on a "common foundation" built from Internet standards and technologies.

The common foundation provides a database and polling engine and is based on SNMP, Remote Monitoring, Java, Common Object Request Broker Architecture, HTTP and HTML.

> *"We're shifting our focus to a user perspective," said Bill Ahlstrom, director of marketing for enterprise network management at Cisco.*

Applications are delivered as plug-in modules to the foundation and are available over the Internet, according to Ahlstrom.

Cisco Resource Manager, which shipped in August, was the first product in the ANS initiative, and the company anticipates many more will join it (*NW*, June 23, page 1).

"All enterprise management products will be mapped to this foundation in 1998," Ahlstrom said.

The product lineup

On the product front, Cisco announced new versions of applications designed to help managers gauge network transmission costs, bandwidth usage and network user requirements.

Cisco Enterprise Accounting (CEA) for NetFlow 2.0 features a number of reports aimed at providing a granular picture of the network.

Network Usage Reports capture a variety of information, including router usage by unit, port and total packet; byte counts by port; and port usage by user and by application, officials said.

Application Reports offer a snapshot of aggregate application usage in packets and bytes, by time of day and user.

User Reports show total traffic to and from users as well as top network users by traffic volume, which can point to special user bandwidth needs and facilitate individual chargebacks for accounting.

CEA for NetFlow 2.0 runs on Microsoft Corp.'s Windows NT operating system and will ship in the middle of this month for $9,995, officials said.

CEA for ISDN 2.0, which also runs on NT, is designed to help manage, control and monitor ISDN usage and requirements, officials said.

The software can produce HTML-, text- and SQL-based reports for export into a number of desktop applications, they said.

CEA for ISDN is available now for $8,995.

Switching gears

For switched networks, Cisco unwrapped CiscoWorks for Switched Internetworks 2.1 (CWSI). CWSI 2.1 delivers four new capabilities: multithreaded discovery, user-based policy tracking, integrated ATM management and enhanced traffic monitoring.

CWSI 2.1's multithreaded discovery agents can uncover and display more than 300 devices and report status and configuration changes five to 10 times faster than CWSI 2.0, said Bill Erdman, product line manager in Cisco's Enterprise line of business.

The user view

User-based policy tracking enables administrators to construct policy management tables from end-node addressing information and Domain Name System host lists. These tables can be used to authenticate virtual LAN membership, Cisco said.

A user-tracking interface, based on the Java Development Kit 1.1, will ship with CWSI 2.1. Policies currently are based on media access control addresses but will be user-based over time, Ahlstrom and Erdman said.

Cisco will leverage Microsoft's Active Directory, the Dynamic Host Configuration Protocol and its own NetFlow technology to achieve that, they said.

For more information, Cisco can be reached at (408) 526-7388.

Sykes is a correspondent for IDG News Service's Boston bureau.

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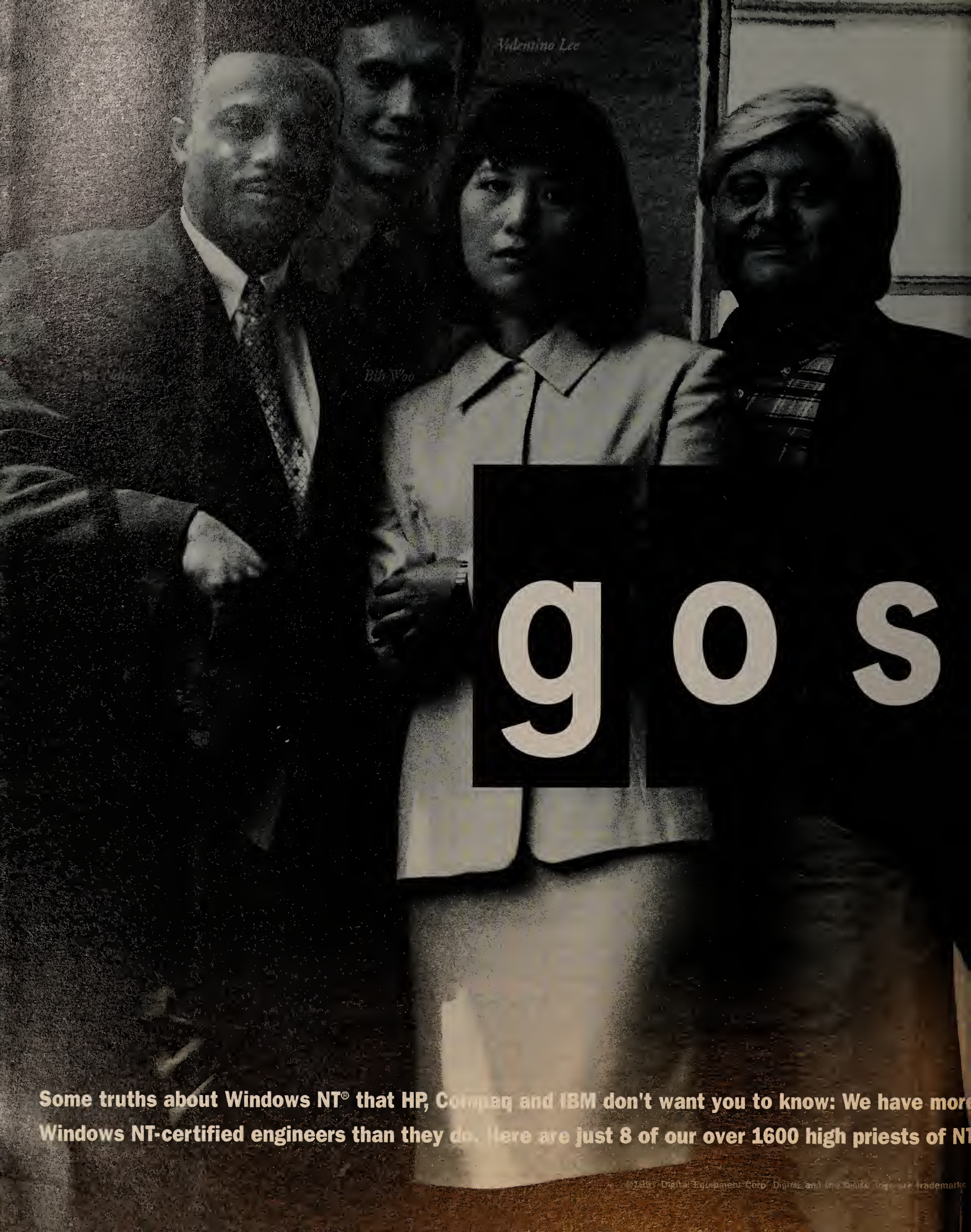

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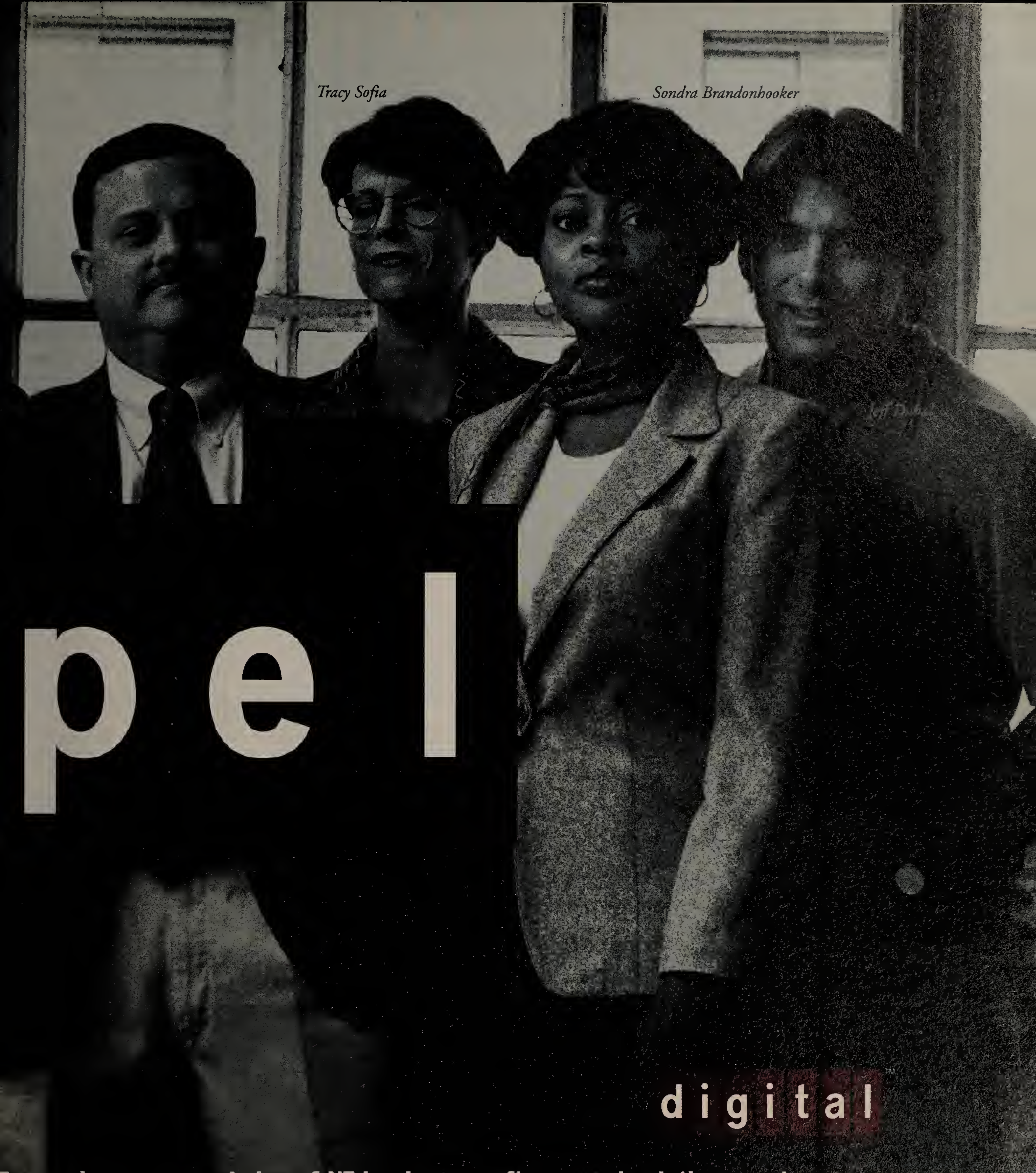

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New multiplexer mixes TDM with ATM

By Tim Greene

Gaithersburg, Md.

If you are considering ATM in your WAN but don't want to dive right in, Data Labs, Inc. has a unique option.

New capabilities for the Data Labs Virtual Access (VA) 500 and 1000, which will be introduced at NetWorld+Interop 97 this week, let it act as a traditional T-1 time-division multiplexer (TDM) or an access device for running ATM over a WAN.

With a Data Labs box on both ends of a T-1 line, the pair can work in hybrid mode, supporting TDM on some channels and ATM on others.

The devices could fit in a network that is upgrading its branch office WAN links to T-1, said Ray Keneipp, a principal with Decisys, Inc., a consultancy in Herndon, Va.

Because the user would be installing a T-1 multiplexer anyway, a VA box would give the user the flexibility to go to ATM at some point in the future using the same gear, Keneipp said.

For Bruce Friedman, the device might prove to be a way to wean himself off a frame relay service he is dissatisfied with. The network systems manager for the San Francisco law firm Morrison & Foerster LLP, Friedman is considering going with private-line T-1s so he has control of his whole network.

The devices could fit in a network that is upgrading its branch office WAN links to T-1, said Ray Keneipp of Decisys, Inc.

Rather than simply muxing the T-1s, he would like to get the statistical gain supported by ATM as well as ATM quality of service that guarantees good voice. He could do that with an ATM service, but setting up ATM gear on private lines would cost less.

The firm also is weighing whether to add video support between offices, and the flexible bandwidth available with ATM is attractive for that, he said.

"We haven't done ATM before, and until you do it yourself, you really don't know what it's like. [VA 500] would let us try it out," he said.

Toggle switch

According to David Haas, marketing director for Data Labs, the transition between TDM mode and ATM mode on the VA devices is so simple a user could switch from one to the other at different times of day to experiment with the ATM during off-peak hours. "It lets users get a feel for ATM, but without paying a lot," he said.

The devices support T-1 circuit emulation for connecting to PBXs. Interfaces for analog voice channels to support key systems are available as well.

The VA 1000 is a two-slot chassis that can support two T-1 ATM/TDM interfaces. The VA 500 supports one T-1 ATM/TDM interface. Both have 10M bit/sec Ethernet ports and can be fitted with serial ports to connect to routers.

Pricing for the VA 500 ranges from $4,000 to $9,000 depending on configuration. The VA 1000 ranges from $5,000 to $15,000.

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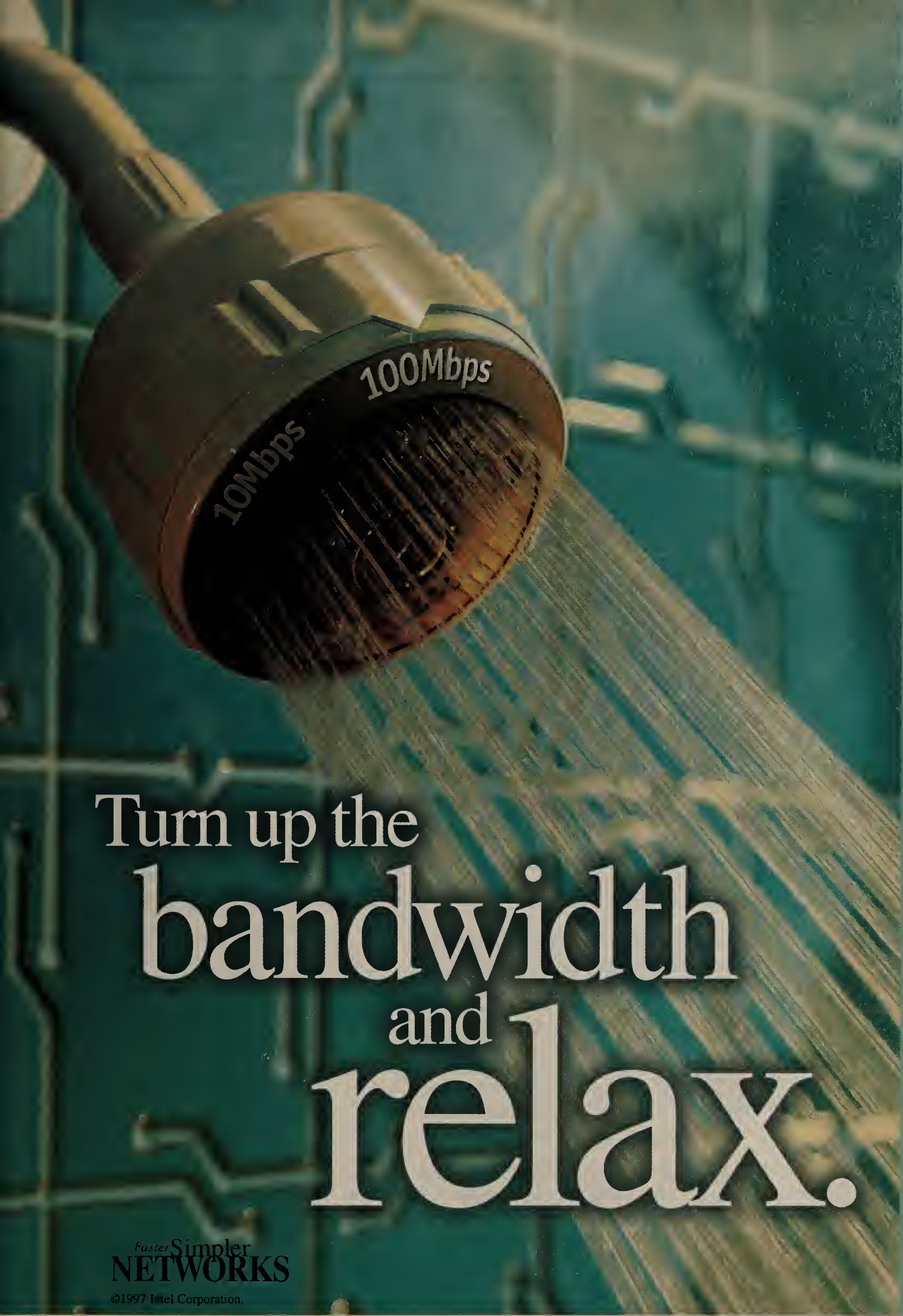

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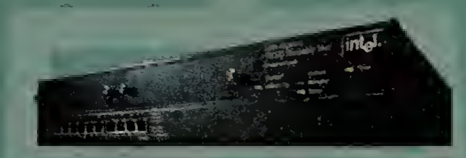

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Boole recasts product line for service mgmt.

"Desired-State" service management initiative includes NT, Web, objects repositories.

By Jim Duffy
San Jose, Calif.

Boole & Babbage, Inc. last week became the latest vendor to jump into the service management fray when it unveiled a new marketing strategy and products for its Command/Post line.

Boole now is a provider of "Desired-State Management" products that link business policies with IT objectives instead of simply automating responses to alarms and events. The Desired-State Management model is designed to ensure users realize acceptable IT service levels by managing applications according to business policy.

To deliver Desired-State Management, Boole is rearchitecting its Command/Post product line into an object-oriented structure with Web-enabled Windows NT clients and so-called state servers. New products, including those announced last week, will be backward-compatible with existing Command/Post offerings, said Saverio Merlo, Boole's vice president of marketing.

The new products include Explorer clients, which feature a 3-D graphical user interface accessible through a Web browser. The Windows NT-based clients support Microsoft Corp.'s OLE/Distributed Component Object Model technology and ActiveX programming environment for Web-based applications.

OBJECTS OF OUR DESIRED-STATE

Elements of Boole's new management strategy:

- Object-oriented architecture for Command/Post
- Windows NT-based, Web-enabled clients
- State servers
- Backward compatibility with existing products
- Most new products available now

Explorer clients include:

- Command/Post Explorer and MAX/Enterprise Explorer for distributed end-to-end enterprise management
- SpaceView Explorer for storage management
- Command MQ Explorer for management of message-oriented middleware
- MainView Explorer for management of Parallel Sysplex and traditional mainframe environments

Command/Post Explorer, MAX/Enterprise Explorer, SpaceView Explorer and Command MQ Explorer are available now. MainView Explorer will be available in mid-1998. Pricing starts at $5,000 for each product.

The new products also include Command/Post State Server, which provides a common object repository and a service-level policy definition interface.

Shipments of the NT-based State Server, which plugs into Boole's existing Unix servers, is expected by mid-1998. Pricing has not yet been determined.

For backward compatibility, the Desired-State Management enhancements are designed to add object and policy sharing to the existing alert synchronization and application launching features already available in Command/Post and MAX/Enterprise.

The new software also will offer interoperability with all leading framework vendors, including IBM subsidiary Tivoli Systems, Inc.'s TME 10, Computer Associates International, Inc.'s Unicenter TNG and Hewlett-Packard Co.'s HP OpenView — as it does now with Command/Post, Boole said.

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New NetShelter™ accessories from APC mean even more peace of mind for Compaq server users

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You can easily integrate the world's most reliable and comprehensive power and environmental protection with your network, no matter what brand of components you have or what OS platforms you use. In addition, NetShelter also houses all the power protection, power management software and accessories you need. All this from one trusted source: APC.

"Think of it as insurance," says *PC Magazine*, in its Network Edition. "You shouldn't try to maintain a powerful client/server environment unless you're also willing to establish a reliable physical environment for your servers."

Easy Installation

Have you ever been frustrated with a rack's inconvenient size and shape? With 73.5 inches (42U) of storage height for industry-standard 19-inch, rack-mountable equipment, NetShelter safely houses the critical network and power protection equipment you need. Placed in datacenters, server rooms, branch offices and wiring closets, NetShelter moves easily, but is totally secure and stable. The cleverly engineered NetShelter rolls through a typical seven-foot office door (84 inches), where other racks get stuck. NetShelter rises to only 81.5 inches, fully assembled on integrated stabilizing feet with casters.

"The importance of a reliable UPS system is twofold: First, we had to protect our significant investment in computer hardware. Second,... our tolerance for downtime is extremely small.

We certainly wanted to include the supporting systems of the business in this concept to the greatest extent possible. To do this, we chose to build the server equipment into the wall of the center, visible from the store side.

"To achieve the 'look' we used APC NetShelter. It was our... first experience with the enclosure. Everyone involved with the installation was very pleased and impressed with the NetShelter. As an end-user, Cyberplay has been extremely pleased with NetShelter and the rest of the APC products on which our business relies."

Bruce Lagravinese
CIO ,Cyberplay Computer Exploration Centers

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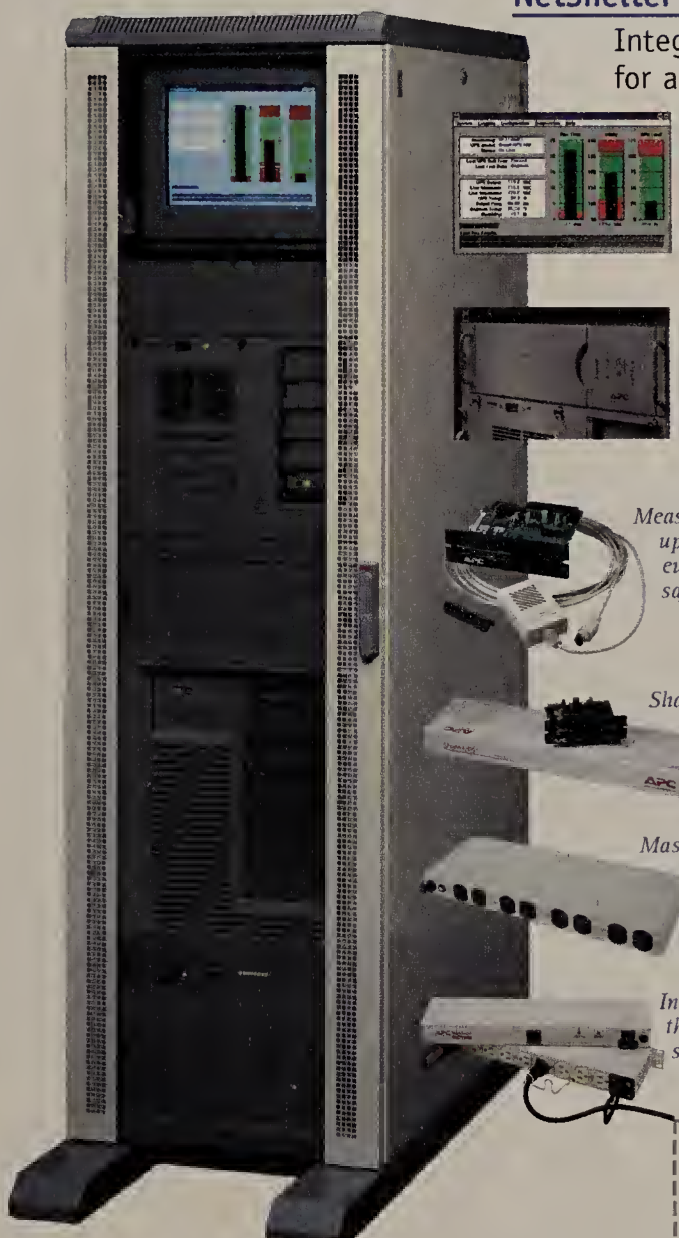

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APC Smart-UPS eliminates problems related to bad power, the single greatest cause of data loss. Power problems are the most common of all network hazards, affecting more than 75% of all networks (source: Contingency Planning).

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INTERNETWORKING MONITOR

TI's departure won't hurt HSTR

On Sept. 25 — exactly 10 days after the High-Speed Token Ring (HSTR) Alliance was formed — Texas Instruments (TI) announced in an e-mail message to HSTR members that it was withdrawing from the alliance. The Tolly Group's Web site has the complete document posted.

This comes as no surprise. The surprise was that TI ever joined in the first place. After all, TI doesn't have hordes of Fortune 500 end-user customers to answer to.

According to Bert Leatch, TI's token-ring program manager and author of the e-mail, TI "understands and supports the motivation of the alliance." He goes on to say, "However, because there is no reasonable market data to suggest that token ring will become a growth opportunity based on the advent of HSTR, it is inconsistent with semiconductor economics for Texas Instruments to make additional R&D investments in this area."

Given that the first official announcement of high-speed token-ring products was made only one day earlier by IBM, it is no surprise that "reasonable market data" did not yet exist. Nonetheless, that was the reason TI gave.

Interestingly, TI is not only neglecting HSTR, it has already given up on 4M/16M bit/sec token ring. The statement notes that deciding not to invest in HSTR "is consistent with our decision in the fall of 1996 to terminate new R&D investments in future Token Ring MAC/PHY silicon."

Didn't know that? While it may not have been a secret, it was "quasi-public" at best. In fact, no press release appears to have been issued.

Kevin Tolly

I think network managers, especially those buying products built with TI token-ring chipsets, would have been interested in this development.

To TI's credit, it is at least taking a stand. In its view, token ring — even 4M/16M — just isn't worth the effort. Fine.

TI's departure doesn't hurt HSTR for one simple reason: HSTR doesn't need TI. There are plenty of highly motivated, technically astute companies vying for a piece of the new HSTR market.

IBM, Olicom and Madge have all created their own high-performance 4M/16M token-ring silicon and are burning the midnight oil to do the same for 100M bit/sec token ring (and later, Gigabit token ring). These companies already have various OEM deals with the likes of 3Com, Cisco and Bay.

TI's move further brightens the prospects for smaller, nimbler silicon designers such as Novacom (www.novacom.com) and start-up Treseq (www.treseq.com).

TI clearly states that it will "continue to supply the current 4M/16M TR MAC & PHY (TMS380XXX) product line to the market for the foreseeable future." Perhaps, after all of the 4/16 100M bit/sec token-ring OEM deals are made, it won't have to.

If you are going to NetWorld+Interop 97 and would like to talk HSTR one-on-one, mark Oct. 9 at 3 p.m. on your schedule. I'll be moderating a special briefing for customers, press and analysts sponsored by the HSTR Alliance. The event will take place in Room 236 West, Georgia World Congress Center. I'll stay around afterward to chat. I hope to see you there.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or at ktolly@tolly.com.

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LIVE FROM MARS.

Canobeam Transmits to "Rave Reviews" at Planetfest '97.

Calling it "one of the slickest pieces of engineering I've seen in awhile", Sterling Software's Robert Tharp, contracted by NASA to provide networking services for Planetfest '97, used Canon's Canobeam Wireless Transmission System to provide the critical link between the main exhibit hall and the conference center, and transmit to the Internet site.

As Tharp explains, "Just about all the information at the Planetfest '97 show and the Internet site passed through the Canobeam laser at some point. We ran the Shownet on ATM between a pair of Cisco routers. Along that ATM path, we were passing everything from www browsing to encapsulated video including spectacular images from mars."

"Canobeam was a 'piece of cake' to operate. The Auto-Tracking System worked perfectly, and the beam stayed completely stable. We were all amazed."

- ***FDDI/ATM OC-3 Speed.***
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- ***Auto-Tracking Insures Reliable Transmission.***

Photo: JPL. NASA.

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Circle Reader Service **#25**

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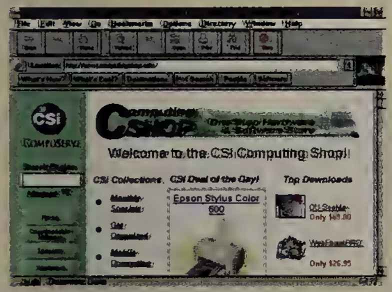
Briefs

Cable & Wireless, Inc. *has introduced Global Intelligent Virtual Network, a traditional* **virtual private network** *service. It provides abbreviated dialing and other voice network features, in addition to switched 56/64K bit/sec dial-up data sessions. The service is available initially in the U.S., U.K., Japan and Hong Kong. It also is available in seven European countries where a subsidiary of Telecom Italia has installed central office-class switches to compete with the dominant national carriers. Eight more countries are due to come online over the next year.*

CompuServe, Inc. *is making it easier for users around the world to purchase software and hardware products. Last week the Columbus, Ohio-based ISP announced its new* **online Computing Shop** *that will let Web surfers buy more than 50,000 hardware and software products over the 'Net. CompuServe's Computing Shop was developed in conjunction with Software Review L.C.'s NetSales service team. NetSales develops turnkey electronic commerce software packages.*



The Telecommunications Resellers Association (TRA) *and the* **National Wireless Resellers Association (NWRA)** *have agreed to* **merge.** *TRA represents smaller carriers that buy bulk minutes from major long-distance carriers for resale to business and residential customers. NWRA represents cellular resellers, many of which hope to resell capacity from digital personal communications services providers.*

MCI: These end-to-end facilities are all ours

By David Rohde

You soon may be able to check off one of the long-awaited goals of nationwide telecommunications reform.

MCI Communications Corp. has become the first carrier to introduce a high-capacity leased-line service in which all the local and long-distance facilities are owned and operated by the same carrier.

The No. 2 long-distance carrier last week unveiled networkMCI Broadband Connections. The service links MCI's emerging Synchronous Optical Network (SONET) long-distance network with the company's self-healing SONET city rings, initially in 22 major markets.

Key to the new service, due to become available in the second quarter of 1998, is a heavily beefed-up network-availability guarantee. If any part of the end-to-end facility is out for even one minute during a month, MCI will credit the customer 50% of the monthly service fee, said Ray Kang, MCI's director of enterprise services marketing. If outages total an hour or more, the entire monthly fee is credited. Such a guarantee "can only be provided where the service provider owns and operates the [entire] facility," Kang said.

Kang also noted other end-to-end services, such as AT&T's Accu-Ring, in which a long-distance carrier leases SONET facilities from a local carrier in order to provide dual entry into the long-distance carrier's central office. But Kang claimed neither regional Bell operating companies nor their upstart competitors are willing to provide the network-availability guarantees MCI sought to help it cobble together an end-to-end service.

The new MCI service has a number of limitations. It is strictly a point-to-point service, and MCI officials conceded it only makes sense for users seeking to link two distant sites rather than establishing a metropolitan-area network. In contrast, most of the RBOCs offer point-to-point and multipoint private SONET services for users seeking redundant broadband connections within a single metro area (*NW*, Sept. 23, 1996, page 31).

In addition, networkMCI Broadband Connections is initially only available at speeds from 45M to 155M bit/sec. MCI is working toward offering a lower minimum speed down to T-1, said Roland Zalite, senior manager of data marketing for MCI. But the initial bandwidth options make the service an expensive proposition.

MCI did not release exact prices, saying they are holding off filing prices with the Federal Communications Commission until later this week. But officials said the long-distance portion probably would be priced 15% higher than MCI's existing T-3 service prices, which start at more than $25,000 a month (see graphic). The local portions would be priced the same as or less than the prices of SONET services of the dominant local carrier in each city, Zalite said.

For users considering T-3 and faster links, the service could actually save money, MCI officials claimed. That is because self-healing SONET rings eliminate the need to buy two redundant ordinary T-3 private lines to hedge against outages, they said.

NetworkMCI Broadband Connections is available only at user sites actually sitting on the MCI ring, carrier officials said. Other MCI local services have been provisioned by running a T-1 backhaul from outlying areas to the MCI rings. ■

A HINT OF PRICES TO COME

- The monthly price for MCI's current T-3 long-distance service before term and volume discounts is $25,571 plus $59.88 per mile.
- The monthly price for the new networkMCI Broadband Connections service is expected to be 15% higher, though the carrier will vary the formula according to specific city pair.

PSI service turns rubles into dollars

PSINet teams with WorldPay to offer users Web hosting with an international flair.

By Denise Pappalardo
Atlanta

The world aspect of the World Wide Web poses a unique challenge for those selling products: How does a customer in another country know what to pay?

PSINet, Inc. today will announce a multicurrency electronic commerce service that automatically converts currency so someone in a foreign country will know how much merchandise on a U.S.-based Web site will cost in their national currency.

In fact, the PSI WorldPay service, to be unveiled here at NetWorld+Interop 97, lets Web merchants support electronic transactions in 126 currencies.

The multicurrency payment system was developed by WorldPay, Ltd., a Supernet Group, Ltd. company (*NW*, Sept. 9, page 16).

The service is open to dedicated Internet access PSINet customers who support their own Web servers. It also is available to customers who use the Internet service provider's Web hosting services.

Adds up to real money

The goal of the system is simplicity. Web shoppers click on a pricing icon on the Web site that will list how much item X costs in various currencies. For example, it would tell Web shoppers from France, Sweden or Portugal how much merchandise costs in francs, kronas or escudos. The icon triggers a message that is sent to the WorldPay server telling it that the Web site needs the most up-to-date currency exchange rates for that item.

The server, based in the U.K., sends the pricing information back to the Web site and displays it on the Web shopper's screen in seconds, said John Watson, director of emerging products for PSIWeb, a subsidiary of PSINet.

PSI WorldPay users will pay a $1,000 set-up fee, which includes software installation and the establishment of a merchant account necessary to process credit card purchases.

WorldPay works solely with U.K.-based National Westminster Bank PLC. Banks in the U.S. and Japan will be added to the system for redundancy, Watson said.

Additional charges for the service include a quarterly $250 licensing fee and a 4% per transaction fee.

Business users that want a bundled offering can sign up for PSINet's PSI WorldPay software and service package.

The package includes Mercantec, Inc.'s SoftCart electronic shopping cart application, WorldPay's software, VeriSign, Inc.'s digital certificate and Secure Sockets Layer 128-bit key encryption tunneling software, and Web site hosting services, Watson said.

The PSI WorldPay package is available for $300 per month in addition to the fees listed above for PSINet dedicated users.

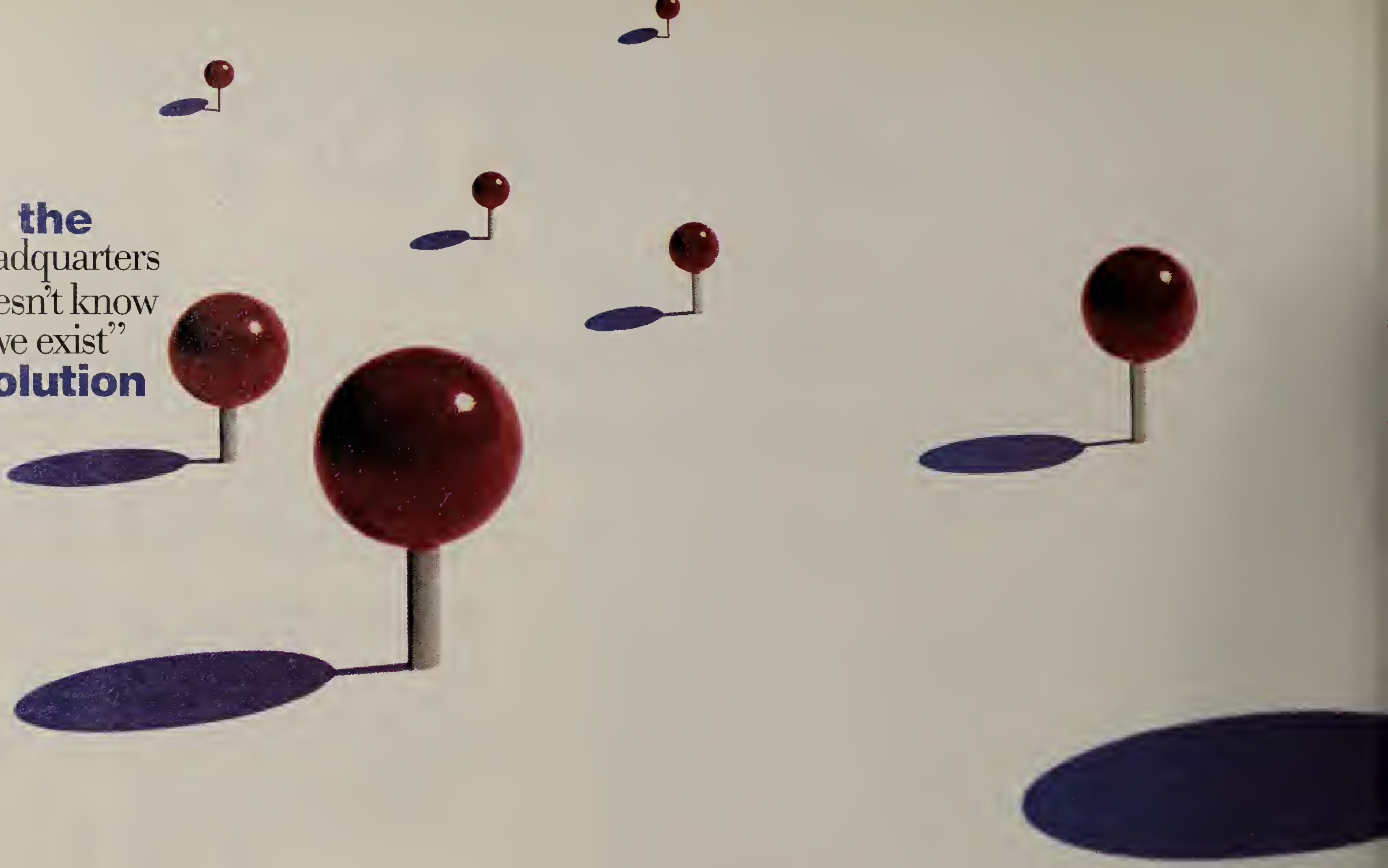
PSINet also will resell WorldPay's service to other ISPs through its wholesale group.

✆ PSINet: (800) 395-1056

DOLLARS AND CENTS

PSINet's PSI WorldPay e-commerce service will let customers set up Web sites that support up to 126 currencies. Costs include:

- ○ A$1,000 onetime setup fee
- ○ A quarterly WorldPay software license fee of $250
- ○ Transaction fees up to 4%
- ○ Transaction fees could be lower based on volume sales



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Circle Reader Service **#23**

Siemens jumps on IP telephony bandwagon

By David Rohde
Santa Clara, Calif.

The nation's third-largest PBX vendor has joined the voice-over-the-'Net game with an Internet telephony server that provides a fallback route to the regular telephone network.

Siemens Business Communication Systems, Inc. recently introduced the Hicom Xpress Telephony Internet Server (TIS), a product that lets users place voice and real-time fax calls over the Internet or a corporate intranet. The new server relies on a T-1 Primary Rate Interface connection to a PBX and makes Internet telephony one of several options simultaneously available to a user with an ordinary telephone handset.

Many PBXs offer a feature called automatic route selection (ARS) that determines the most economical carrier calling plan to use to route each call, based on the number dialed. When linked to a PBX, the Hicom Xpress TIS adds Internet telephony — with its ability to cut out the carrier toll — as one of the principal ARS options.

The costs of voice over IP

Total hardware and software prices for different configurations of Siemens' Hicom Xpress Telephony Internet Server:

▶ System with 12 voice ports	$22,850
▶ System with 46 voice ports and 28 fax ports	$71,350

When a call is placed, the server checks to see whether the calling party has a Hicom Xpress TIS with an available port. If the party does and there is no Internet congestion to cause a delay greater than 100 msec, the call is completed over the Internet, explained Naser Sheikhzadegan, a TIS product manager. If not, the call is completed over the regular local or long-distance network, he said.

One analyst cautioned against jumping on the Internet and suggested sticking to intranets. In fact, the fallback feature is key to ensuring that a company's initial use of Internet telephony is limited to dialing over a corporate intranet where congestion is limited, said Ken Landoline, voice-systems analyst with Giga Information Group, Inc. "It's not something that I want to expose my CEO to when he picks up the phone and sounds like Donald Duck," Landoline said.

Landoline also recommended that Siemens build in an additional fallback option so an Internet call can be switched over to the telephone network if quality declines in the middle of the call. Such a feature will not be available in the first release, but Siemens is working on it, Sheikhzadegan said.

The product is expected to compete with PBX market leader Lucent Technologies, Inc.'s Internet Telephony Server, as well as a host of smaller vendors' offerings, some of which require a multimedia PC. The Hicom Xpress TIS is designed to integrate with Siemens' new flagship Hicom 300 E PBX. It also will work with other Siemens and competitors' PBXs, Siemens officials said.

The product consists of a Pentium-class PC running Windows NT 4.0 loaded with digital signal processing boards from Vienna Systems Corp., of Kanata, Ontario. It includes software created jointly by Siemens and Vienna Systems.

Prices vary by configuration (see graphic). General availability is slated for next March.

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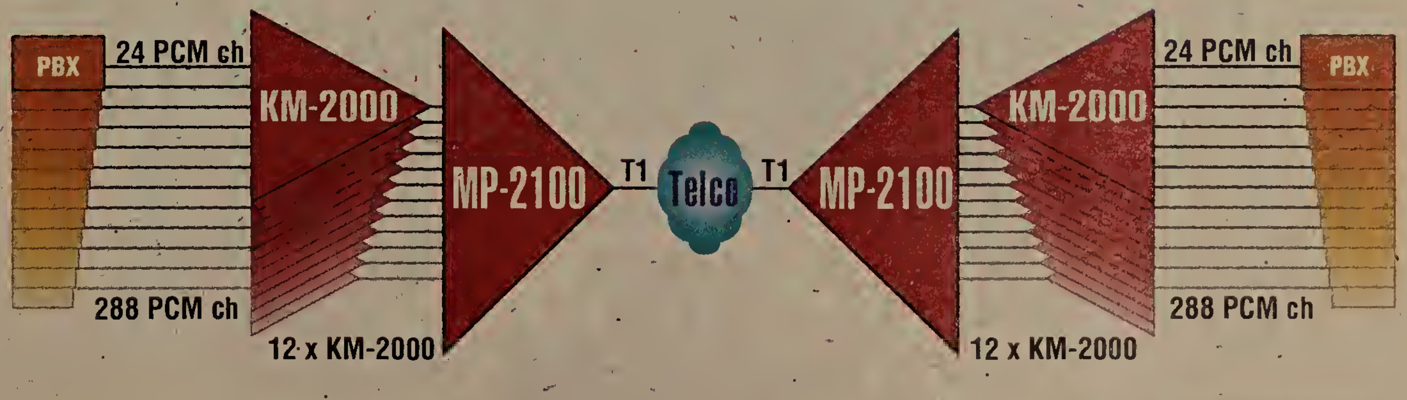

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*Circle Reader Service #***48**

Intermedia shows complete frame relay picture

By Tim Greene

Tampa, Fla.

If your wide-area frame relay network spans several different carriers, it can be tough to figure out whether each one is living up to its service-level agreement.

But at NetWorld+Interop 97, Intermedia Communications, Inc. will introduce a service that lets users see into not only the Intermedia network, but also into the networks of every other carrier that provides a link in their WANs.

An expansion of Intermedia's current ViewSPAN, the service draws on switch information provided by Intermedia as well as data gathered by probes at each node of the customer's network.

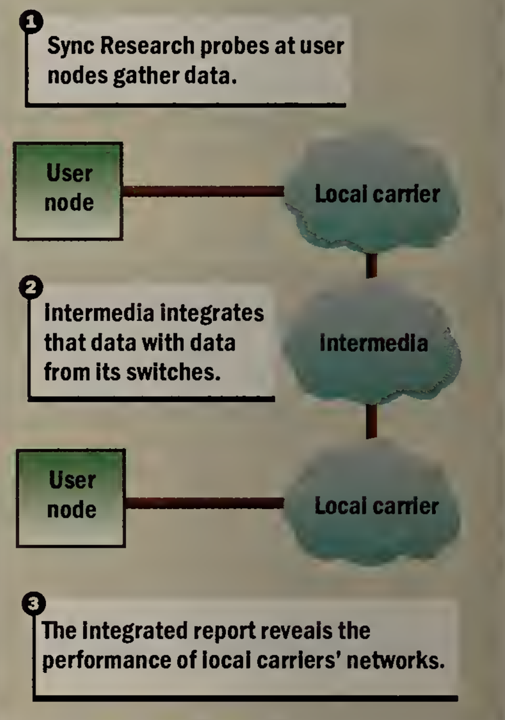
In a typical frame relay WAN, the customer pieces together services of local carriers that connect directly to customer sites and a carrier that handles the long-distance runs.

Intermedia gets information from the probes about the perimeter of the network and combines that with information harvested from its Ascend Communications, Inc. switches. That gives Intermedia enough information to deduce the performance of the local carrier networks that lie in between.

That performance data is made available via a dedicated permanent virtual circuit (PVC) to the customer. The information is updated at 5-minute intervals.

Intermedia sees everything

Intermedia Communications' ViewSPAN service reveals carrier performance using three steps.


1
Sync Research probes at user nodes gather data.
User node
Local carrier
2
Intermedia integrates that data with data from its switches.
Intermedia
User node
Local carrier
3
The integrated report reveals the performance of local carriers' networks.

Users can receive data on network delay, delivery of committed information rates, delivery of discard-eligible frames and availability of individual PVCs.

Earlier this year, Intermedia introduced ViewSPAN, but it lacked the ability to offer a glimpse of the local network provider's performance unless that carrier used Ascend frame relay switches.

The new service relies on Sync Research, Inc. frame relay access probes, DSUs/CSUs that gather local management information independent of the local router. That enables the net manager to distinguish between a line failure and an equipment failure, Intermedia said.

Users already can install the smart DSUs/CSUs themselves and get performance data about the WAN as a whole. But until now they could not break down the performance of individual carriers.

The cost of ViewSPAN services ranges from $15 to $25 per node up to $170 to $190 per node. They are now available to customers in the Intermedia service region in the eastern U.S. Current Intermedia customers will get the ViewSPAN enhancements before new customers.

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Circle Reader Service #37

EYE ON THE CARRIERS

User groups follow AT&T spinoff

Just over one year ago, AT&T completed its spinoff of Lucent Technologies. But you could have anticipated the ultimate split by looking at AT&T's user groups.

Even before the breakup, AT&T had two principal user groups — one for network services and one for communications equipment. In the year since, both groups have reorganized and refreshed themselves. Today they sport new names, new Web sites and new missions that remarkably dovetail the ambitions of their giant vendors.

If you pay money to AT&T and Lucent and haven't yet made the acquaintance of the Enterprise Networking Technologies Users Association (ENTUA) and the International Definity Users Group (INDUG), now's probably a good time to do so.

ENTUA is the new name of the venerable SDN Users Group combined with previous user committees monitoring AT&T's 800 and other key services. The new name may be a little presumptuous for a group that really focuses on just one vendor, but the aim is apt.

In the late 1980s and early 1990s, AT&T's Software Defined Network became the principal vehicle for large companies to obtain cut rates and special calling features from AT&T's switched network without buying expensive private lines. Then, as frame relay started taking data traffic off leased lines and inbound 800 traffic exploded, AT&T combined SDN, 800 and frame relay into a single-term contract called OneNet.

The goal for AT&T was simple: Keep users away from MCI, Sprint and ultimately the Bells for years at a time. The response of users was to protect their investments by taking a more holistic look at the vendor. Now ENTUA is especially focusing on AT&T's international services, electronic commerce initiatives and integration of telephony and Internet commerce in call centers, says ENTUA President Reg Bernard, assistant director of communications services at State Farm Insurance Co. in Bloomington, Ill.

David Rohde

INDUG's focus still is a little more product-specific. Definity refers to Lucent's flagship PBX, or "enterprise communications server" in current Lucent parlance. The group results from the merger of two previous Definity groups that tracked the evolution of two older AT&T PBX platforms into different Definity models.

Now INDUG is keenly monitoring Lucent's new thrust into data networking, says Patric Brayden, INDUG president and manager of telecommunications at Seattle's Group Health Cooperative. Upcoming INDUG regional meetings in Williamsburg, Va.; Cleveland; San Antonio, Texas; and Palm Springs, Calif., will receive briefings about Lucent's new ATM switches and access concentrators, which the vendor is pitching as cost-savers for a unified voice and data infrastructure (*NW*, Sept. 22, page 1).

For more information, check out the groups' Web sites at www.entua.org and www.indug.org. INDUG's online information is more complete and organized, and includes chat rooms and password-protected analyses of issues such as Lucent's proposed acquisition of voice-mail king Octel. ENTUA's site is under construction but contains a list of officers and links to key events.

Rohde is Network World's *senior editor of Carriers & ISPs. He can be reached at david_rohde@nww.com.*

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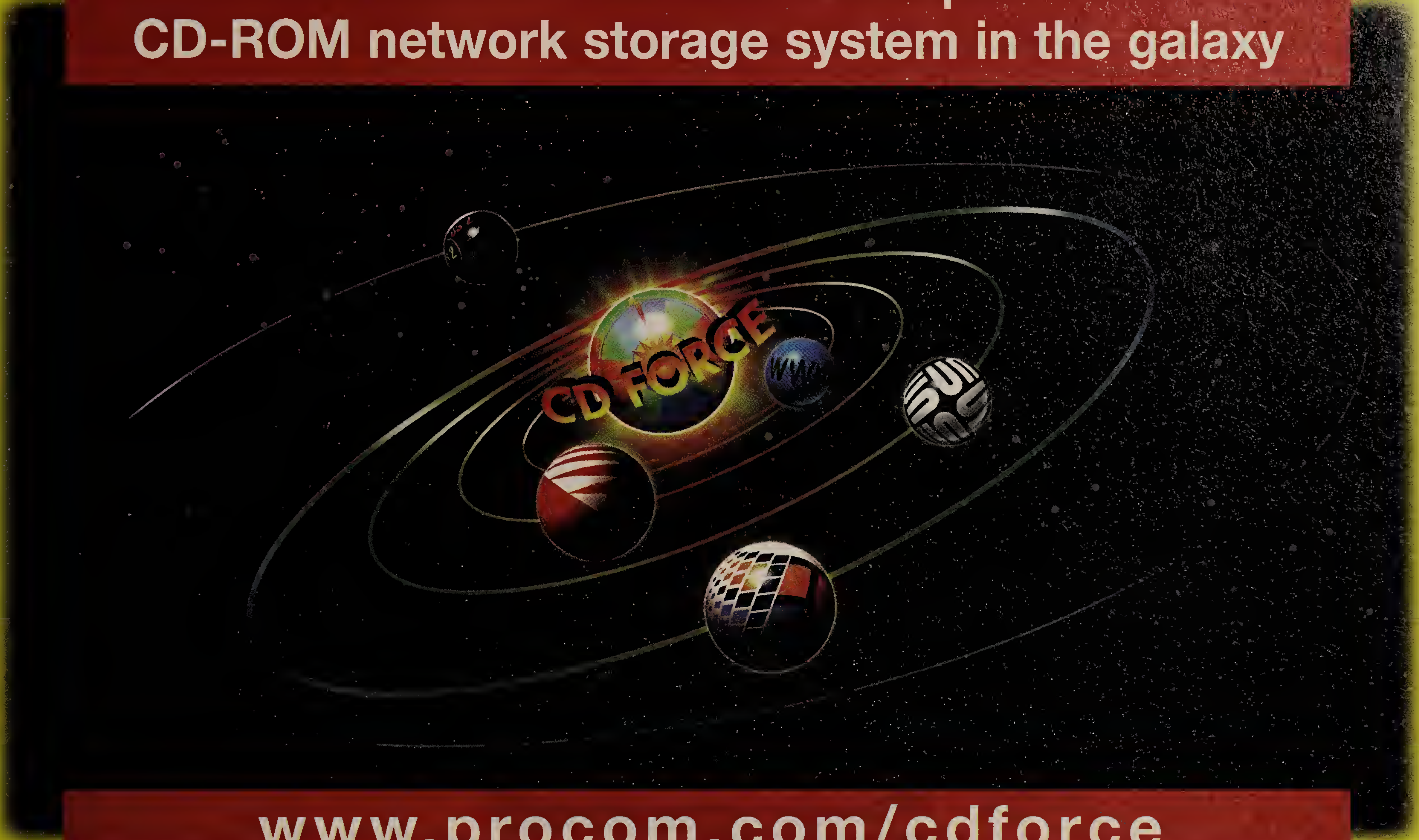

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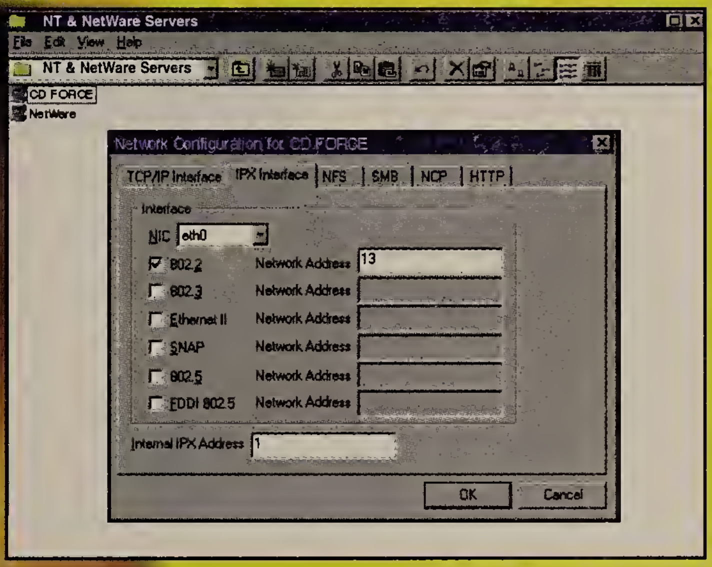

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Internet services

The comfort zone

By Denise Pappalardo

Today, business users have many choices when it comes to selecting an Internet service provider. National ISP powerhouses such as UUNET Technologies, MCI Communications Corp. and PSINet, Inc. certainly can meet the needs of almost any user. But some users are deciding against the big guys and instead are choosing Internet services from their local exchange carriers (LEC).

So what does BellSouth Corp., Southwestern Bell Corp. or US WEST, Inc. offer business users that they cannot get from a big ISP?

Familiarity, competitive pricing, dependable customer service and an all-around feeling of comfort were some of the reasons users sited for choosing their LEC's Internet services.

The big ISPs are wrapped up in talking about network architecture and how many peering points they have. The thing is, users don't care that much about these issues, says Christopher Mines, senior analyst at Forrester Research, Inc., a consulting firm in Cambridge, Mass. "Users care about customer support, pricing and, in a sense, hand-holding, which some of the LECs have been aggressively pursuing," he says.

Businesses that are focused on a single geographic region often use more than just their LEC's local voice services. In fact, many users also sign up for local data services and enhanced voice services. These users recognize the Bell name and like knowing the company they are dealing with.

This is a plus for the LECs that cannot sell services based on the amount of fiber-optic miles or ATM switches they just added to their Internet backbone, because they don't have their own Internet backbone.

Instead, all of the LECs, with one exception, use Internet backbone services from one or more of the national ISPs to provide their customers with access to the Internet (see graphic). For example, BellSouth uses GridNet International and IBM Global Services to connect its dial-up and dedicated users to the Internet.

GTE Corp. is the only exception. The company is a LEC that owns its own Internet backbone. Early this year, GTE acquired BBN Corp., one of the first and largest national ISPs. The new division at GTE, now called GTE Internetworking, even supports traffic from some of its competitors, such as US WEST and AT&T.

Some LEC ISPs have struck deals with multiple national ISP backbone providers to offer customers more choices. And users want that flexibility.

Erlanger Health System, a hospital in Chattanooga, Tenn., selected BellSouth because it had the option of switching its Internet backbone provider if it was not satisfied with the service, says John Haltom, network director at Erlanger. This is the type of flexibility you don't have if you sign up with a single national ISP, where you are basically stuck with one network, Haltom says.

There were two other reasons for the hospital's choice: familiarity with BellSouth's support staff and a bandwidth monitoring service it offers, he says.

Erlanger is a teaching hospital, which means education is a key part of the medical staff's responsibilities. Therefore, Haltom is called upon to make sure the medical staff has innovative ways of making available new and important information.

In addition to e-mail and Internet surfing, the medical staff at Erlanger also is sending point-to-multipoint video broadcasts over its T-1 Internet connection, Haltom says.

Haltom has other plans

"One of the other big Internet applications we are developing is a shared medical system for patient records," Haltom says. Erlanger is working on developing an application that will link the Internet with the hospital's legacy network, where patient charts are stored, he says.

What your local exchange provider is offering

LEC	Dedicated access	Dial-up access	Web hosting	Primary network providers
Ameritech	Frame relay, T-1	28.8K bit/sec, ISDN, ADSL trial	Only for dial-up	UUNET, AGIS
Bell Atlantic	Frame relay, T-1, SMDS	33.6K bit/sec, limited 56K bit/sec, ISDN, ADSL trial	Yes	AGIS, ANS, IBM Global Services
BellSouth	Frame relay, T-1, T-3	33.6K bit/sec, 56K bit/sec trial, ISDN, ADSL trial	On a per-customer basis	IBM Global Services, GridNet
GTE Internetworking	Frame relay, T-1, T-3	33.6K bit/sec and 56K bit/sec in some areas, ISDN	Yes	Operates its own backbone
US WEST	Frame relay, ATM, T-1, T-3	33.6K bit/sec, ISDN	Yes	UUNET, GTE Internetworking
Southwestern Bell/Pacific Bell	Frame relay, T-1, T-3,	33.6K bit/sec, ISDN, ADSL	Yes	Sprint, Digex, IBM Global

"This way the charts will look exactly the same regardless if you are accessing them from your office or at home," he says. Erlanger is hoping to have that application up and running by mid-1998.

BellSouth is working in conjunction with GridNet, one of the LEC's Internet backbone providers, to offer a bandwidth monitoring service that is included in Erlanger's $600-per-month service charge. The monitoring service guarantees that if Erlanger's T-1 reaches 80% capacity, BellSouth will notify the organization and beef up the bandwidth so packets will not be dropped. "No one, at the time we were shopping for an ISP, could offer us the same guarantee," Haltom says.

Unlike Erlanger, Thrifty Car Rental, based in Tulsa, Okla., had never worked with Southwestern Bell, the incumbent LEC in its neck of the woods. But Thrifty signed up for Southwestern Bell's Internet services for other reasons.

Earlier this year, Thrifty decided to bring its Web hosting in-house and developed an intranet. This started the company's search for an ISP to provision a dedicated T-1 connection to the Internet, says Jim Henderson, Web systems administrator at the car rental company.

Thrifty contacted a handful of ISPs, most of them national, as well as Southwestern Bell. Besides the fact that many of the ISPs did not respond to Thrifty's inquiry, those that did were too expensive, he says. "We found [Southwestern Bell] to be the most trustworthy," Henderson says. "They offered us a good price, and the rates went down even further because we signed a longer-term contract.

"One of the nice advantages of working with [Southwestern Bell] is that they set everything up for us," he says. From Thrifty's Ascend Pipeline 130 router to its firewall software, Southwestern Bell took care of everything, he says.

What it takes

While the LECs are offering some business users a degree of comfort when it comes to the unknown world of the Internet, they still face challenges, Forrester's Mines says. The LECs will be successful in the Internet service market only if they continue to offer quality customer service, actively market their brands and continue to exploit the IP backbone networks they are using to support their services.

Keeping up with technology also is critical, Mines says. Performance and latency guarantees are starting to play larger roles in Internet business service offerings, and LECs have been slow to respond. "The LECs will have to beef up their IP smarts even as resellers if they plan on staying ahead of the curve," he says. ■

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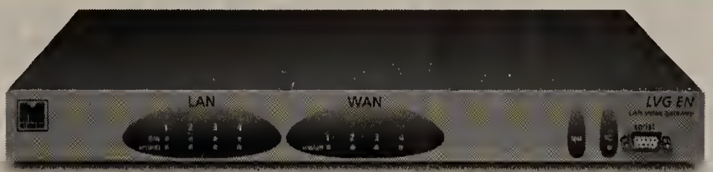

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Briefs

■ **Edify Corp.** *this week announced it is shipping Electronic Workforce 5.0 for Windows. Previously, the* **order-status and payment-support application suite** *was available only on OS/2. In addition, Edify next year plans to release versions of Electronic Workforce that will support Microsoft Corp.'s ActiveX technology and the Open Management Group's Common Object Request Broker Architecture.*

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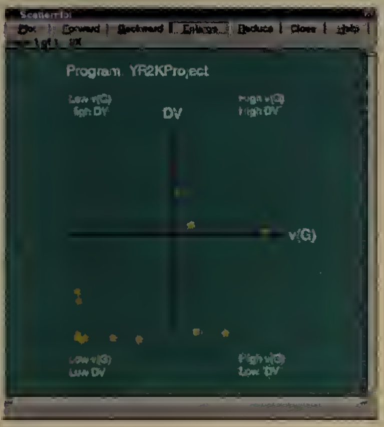
■ **McCabe & Associates,** *of Columbia, Md., last week announced McCabe Visual 2000 2.0, server software designed to give* **year 2000** *teams a graphical view of code to help them prioritize testing opportunities.*



Visual 2000's Scatterplot Diagrams *provide a bird's-eye view of the quality of the system and thoroughness of testing performed within a system.*

Available immediately, Visual 2000 2.0 runs on Solaris 2.4 or higher and Windows NT and 95. The software starts at $50,000 per server.

© McCabe: (800) 638-6316

■ **PeopleSoft, Inc.,** *which sells enterprise application software to large corporations, last week announced a new division called PeopleSoft Select to market specifically to* **mid-size companies.** *PeopleSoft Select will bundle its software with products from Hewlett-Packard Co., Compaq Computer Corp. and Microsoft Corp., adding a configuration tool called SelectPath to ease installation.*

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Emerging electronic commerce standard passes first big test

Motorola and Office Depot give Open Buying on the Internet spec a whirl.

By Paul McNamara

Marlborough, Mass.

The first pilot implementation of technology designed for high-volume, low-cost supply purchases over the World Wide Web has received good reviews from participants.

The Open Buying on the Internet (OBI) standard was put to the test by Motorola, Inc., Office Depot, Inc. and Intelisys Electronic Commerce LLC.

Representatives from the companies last month reported at a conference of the fledgling OBI Consortium that an ongoing test run of Intelisys' OBI-compliant Intelipro software had successfully linked three Motorola purchasing sites with supplier Office Depot.

Conference attendees were walked through a live demonstration of the Web- and electronic data interchange-based system, which is aimed at putting requisitioning power directly in the hands of frontline employees.

The goal is to reduce cycle times and cut costs while maintaining company control over workflow authorizations and accounting processes.

The OBI specification, introduced in June, is built on the established ANSI X12 EDI 850 purchase order transaction set.

But it is adjusted for IP transport and enhanced with Secure Sockets Layer and X.509 digital certification security technology (*NW*, June 2, page 1).

Motorola and Office Depot officials said the companies were pleased with the initial results, yet mindful of training challenges, scalability concerns and the potentially thorny issue of certifying OBI compliance.

"We didn't correctly estimate how much training we had to do [with end users] on the new process," said Monica Luechtefeld, vice president of contract management and new business development at Office Depot. "However, there was an excitement once we got started."

Once familiar with the procedures, Motorola's requisitioners found the new system worked well, said Bob Frith, manager of standards, strategy and development.

"We don't know yet what's going to happen when we roll this out to 50,000 people worldwide," Frith said. "I'm sure we're going to have some challenges."

The OBI Consortium is working to define certification language and establish a process for measuring compliance.

KATHY TARANTOLA

Motorola's Bob Frith *discusses his company's pilot test of an Open Buying on the Internet-compliant supply purchasing program with a member of the consortium pushing OBI as a standard implementation model.*

"We need to be able to clearly articulate to people what it means to go through the compliance process, what it means to have a review and what it means to be certified," Luechtefeld said.

"That needs to happen fairly soon [lest businesses begin] saying they're compliant and it's absolutely not true," she said.

The potential benefits of bringing OBI to fruition were made clear in a recent report from market research firm International Data Corp. (IDC), of Framingham, Mass.

IDC estimates that electronic commerce conducted over the Internet will increase from an estimated $10 billion in 1997 to more than $220 billion by 2001, with 80% of that volume consisting of business-to-business transactions.

Among the companies supporting the OBI Consortium and considering product implementations are Microsoft Corp., Oracle Corp. and Open Market, Inc., as well as Actra Business Systems LLC, the joint venture between Netscape Communications Corp. and GE Information Services, Inc. ■

Netscape extends browser reach with Aurora

Technology challenges Microsoft's Active Desktop by giving browsers file, database access.

By Kristi Essick

Netscape Communications Corp. last week demonstrated Aurora, a new technology that lets users browse files on a hard drive and access information in databases using Netscape Communicator as a client.

"Those [Microsoft Active Desktop applications] are not killer, overwhelming, unduplicatable features and functions."

James Barksdale, president and CEO, Netscape

MARK ESCHER

Netscape's move is in direct response to Microsoft Corp.'s efforts to integrate its Internet Explorer 4.0 browser into the Windows 98 operating system.

The integration of Explorer into Windows 98 OS will let users access files such as Word documents, Excel spreadsheets and e-mail messages through a browser interface.

Windows 98's Active Desktop uses Web navigation methods and HTML presentations to manage files on multiple sources locally and remotely.

With Aurora, Netscape is proving the company can offer the same sort of integration between browser and operating system, but not limit the implementation to Windows 98, said James Barksdale, Netscape's president and CEO.

Aurora will be based on a standard for describing diverse sets of information called the Resource Description Framework (RDF).

This is a Web site layout language technology that organizes, describes and displays information from the Internet, intranets, LANs, legacy databases and PC hard drives into one universally recognizable format, according to Netscape.

Aurora will use RDF to let users access files on a desktop or information on a database via the Communicator interface — a move similar to what Microsoft is trying to do with the Active Desktop, Barksdale said.

Aurora, which will become part of the Communicator browser and groupware package, will be tied closely with several operating systems, Barksdale said.

Initially Aurora will support Windows 95, Windows 3.1 and the soon-to-be released Windows 98, he said.

Netscape will develop future versions of Aurora for a variety of Unix platforms,

See **Aurora,** *page 64*

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COMPAQ

Microsoft's Internet Explorer 4.0 arrives

By Torsten Busse

San Francisco

After months of prelaunch marketing activities, Microsoft Corp. last week officially took the wraps off its new Web browser, Internet Explorer 4.0.

The free software, which Microsoft hopes will lift the company's browser market share beyond 50%, is designed to meet the Internet surfing needs of corporate customers and individual consumers. Predicting that within 10 years people will be living "a Web lifestyle," Microsoft's Chairman and CEO Bill Gates said the browser is his company's contribution to accomplishing that vision.

Gates predicted that during its lifetime the software will capture more than 50% of the browser market. That means Microsoft will have to add more than 14% in market share in the corporate arena, according to Zona Research, Inc., a market research firm in Redwood City, Calif.

Over the past three weeks, Zona polled 279 corporations and found that 36% of the respondents are using Internet Explorer as their primary browser. However, Netscape Communications Corp.'s Navigator still remains the leading primary browser at 62% of enterprises.

Microsoft accompanied last week's Internet Explorer launch with the announcement that 20 corporations representing 300,000 desktops will standardize on the browser.

Microsoft's Gates *feels that Internet Explorer will help give people a "Web lifestyle" within the next 10 years.*

The list includes many high-tech and PC companies, as well as other companies such as Dow Chemical Co., Toyota Motor Sales USA, Inc. and Bechtel Corp.

Among the new features in Explorer Version 4.0 that may attract corporate users is Active Channel, which lets companies customize information delivered to the end user's desktop via push technology.

Also targeted toward corporate users are the following: Active Desktop, which lets users turn their desktop interfaces into customized Web pages; the ability to browse a PC's hard drive using the browser; and an improved Administration Kit, which lets IS managers deploy the browser and customize it for individual users.

Windows 95 and NT versions of Internet Explorer 4.0 are available for download from Microsoft's Web site at www.microsoft.com. The Web site also offers a $4.95 CD-ROM version (including shipping and handling) that can be ordered over the 'Net.

Over the next two months, Microsoft also promises to offer Macintosh and Windows 3.1 versions of the browser, while Unix versions are due to ship in the first quarter of 1998.

For more information, contact Microsoft at (206) 882-8080.

Busse is a correspondent at IDG News Service's San Francisco bureau.

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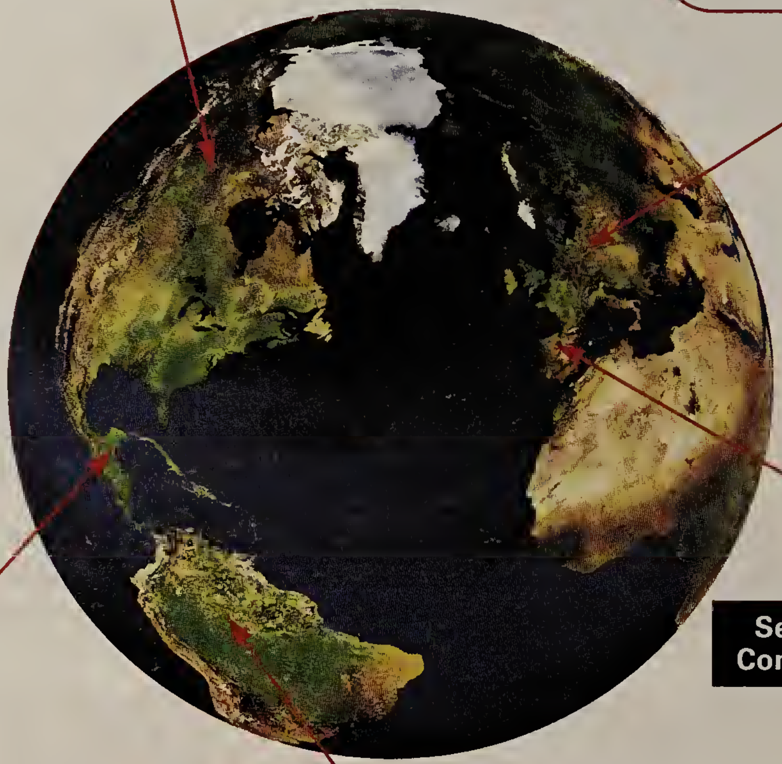

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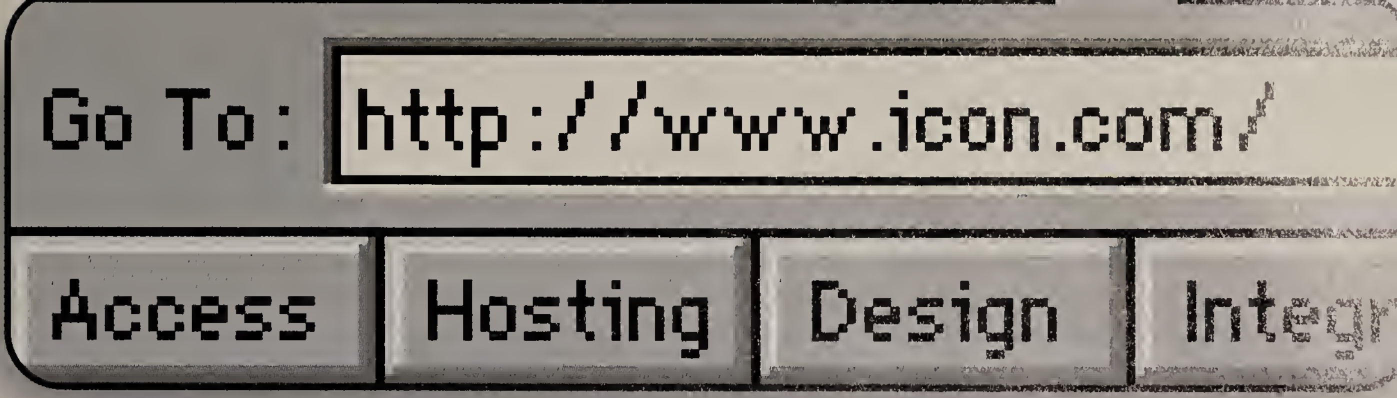

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Circle Reader Service # 53

Pretty Good Privacy makes electronic mail more secure

By Ellen Messmer
San Mateo, Calif.

Pretty Good Privacy, Inc. last week rolled out an application suite for companies that want employees to digitally sign and encrypt messages according to designated security guidelines.

PGP 5.5 for Business Security — based on freeware that has been used on the Internet for years — marks Pretty Good Privacy's entry into the enterprise network- ready e-mail security software market.

The application suite consists of three primary parts: an e-mail client add-on, an e-mail server agent that ensures messages adhere to company security policies, and a certificate management server.

The client software lets users of Eudora, Microsoft Exchange, Outlook and Macintosh-based Claris e-mail encrypt and decrypt messages using up to 2,048-bit encryption.

To ensure that employees encrypt messages according to company policy, companies can use PGP Policy Management Agent for SMTP on their e-mail servers. The agent can be configured to bounce unencrypted mail back to the originator with instructions on how to adhere to the corporate policy. Mail also can be captured and held for review by a company's security administrator.

E-mail security can be further ensured by using Pretty Good Privacy's certificate management server.

The server contains information — in the form of public-key encryption certificates — that message recipients can use to verify that the person who claims to have sent a message really did send it.

From the certificate management server, a company's security manager also can issue certificates to approved end users. The certificate server is based on the Lightweight Directory Access Protocol and HTTP, which enables end users to search a distributed repository of public keys.

The ability to verify certificates is a central feature in all public-key systems. But Pretty Good Privacy's software differs in that it does not use standard X.509 3.0 certificates, which are based on a system of hierarchical trust.

In contrast, proprietary Pretty Good Privacy certificates can carry multiple signatures, so the same certificate might be used for different purposes.

The software works under the notion of a "web of trust" in which individuals within a group agree to accept certificates issued to each other.

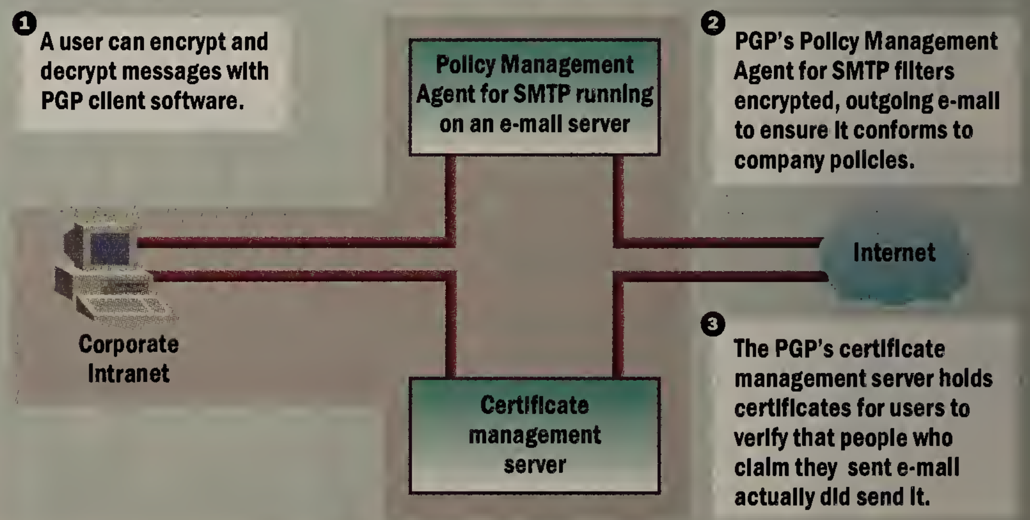
The certificates also can be used hierarchically. In this case, they only would be considered valid if the security manager signs them, for instance. They also can be configured for a one-to-one exchange only.

A freeware version of Pretty Good Privacy's e-mail encryption software was

See **PGP,** *page 64*

E-MAIL SECURITY POLICY

PGP 5.5 for Business Security, an application suite, consists of three parts: an e-mail client add-on, a Policy Management Agent for SMTP and a certificate management server.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❸ The PGP's certificate management server holds certificates for users to verify that people who claim they sent e-mail actually did send it.

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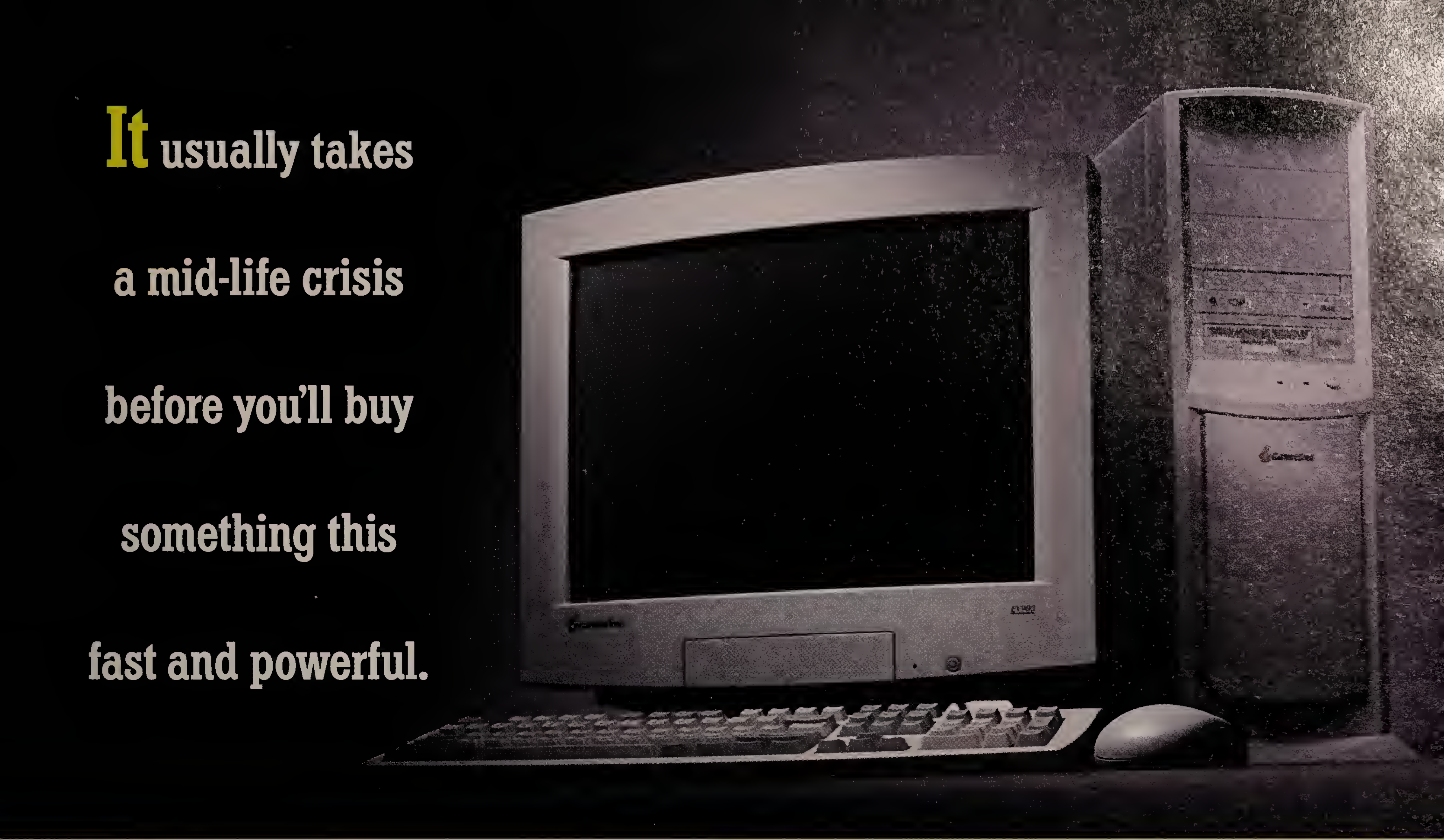

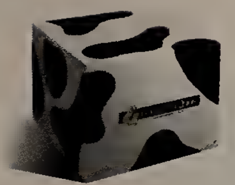

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Aurora

Continued from page 60

as well as the Mac OS, he added.

It is still unclear how much participation will be needed from database vendors and application developers to make Aurora work with their products, according to Barksdale.

There is a way to work with Netscape-supported databases to do some of the RDF formatting required from Netscape already.

However, Barksdale said it is in the database and application vendors' best interests to make products compatible with RDF if the vendors want to give users data access via a browser interface.

Netscape is supporting RDF as a new standard.

Users have been asking Netscape when they will be able to use Communicator to access legacy files, directories, security information and push channels, Barksdale said.

"This is an effort to answer these questions," he said.

There has been little customer demand to access files on the hard drive, such as Microsoft Office documents, using the Netscape browser, Barksdale added.

While Netscape is building this hard-drive browsing capability into Aurora in case some users want it, it will not be the most important function. "If people find that to be helpful, fine," Barksdale said.

Barksdale called Microsoft's Internet Explorer 4.0 "cumbersome and confusing" to use, adding that its integration with Windows 98 creates a bloated application that users may not want.

"I have a house and I have a boat, but that doesn't mean I want a houseboat," Barksdale said.

Aurora will differ from Active Desktop because Aurora will focus on letting users integrate Communicator with their operating system of choice — but users will not be forced to do so, Barksdale said.

In much the same way that users can opt to use the NetCaster component of Netscape Communicator, Aurora will be a choice, he said. Netscape's theory is that browsers will become the "common platform" and "the operating systems will become plug-ins to that platform," Barksdale said.

Aurora is a first step in that direction.

Netscape will launch Aurora as part of Communicator for Windows 98 at the same time that Windows 98 is released, Barksdale said.

However, specific release dates for the product on various platforms have not yet been announced.

Essick is a correspondent with IDG News Service's London bureau.

PGP

Continued from page 60

devised years ago by Phil Zimmerman. It brought down the wrath of the U.S. Department of Justice, which wanted to keep tight controls on strong encryption.

An earlier commercial product called PGP Business Edition won some acceptance in isolated corporate departments.

But the client software was difficult to use with different mail packages, and the offering lacked a certificate management component, said Helena Winkler, Pretty Good Privacy's client product director.

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'NET INSIDER

A distorted economy

In his Sept. 22 editorial, *Network World* Editor in Chief John Gallant wrote about the imminent major change in the telecom world that will stem from development of the "true integration of packetized voice and data" across various types of networks. I wonder just why this change is so inevitable.

It does not make much sense using existing technologies and may not even make technical sense in the long run. Yet the path to global service integration is painted as a golden one.

Voice and data make very different demands on a network. The very tight delay variation tolerances required in the interactive voice world are in conflict with the demands on a packet-based data service, which is more concerned with delivery reliability than delay variation.

Voice connections tend to be of long duration, with multiple minutes being a short call. The average data connection on the Internet, on the other hand, is less than a dozen packets and is finished in a few seconds. A network built to support voice traffic well will be different and more expensive than a network built to support data. Carrying data over a combined network would be more expensive than carrying the same data over a data-only network.

If the amount of data to be carried is relatively small, the additional cost of integrating voice and data easily could be less than the savings resulting from having a single physical infrastructure.

But in a few years there will be more data bits transferred over the telecommunications systems than voice bits. A higher percentage of data traffic will reduce the comparative benefits of integration, eventually to a point where integration costs more than it saves.

In his editorial, Gallant wrote about integrating "packetized voice and data traffic on more cost-effective carrier/Internet service provider services." Putting aside for a moment the issue that we do not have deployable technologies to support this type of integration over WANs, how can it be true that packet services are more "cost-effective?"

Scott Bradner

It is true, not because of any better efficiencies of packets as compared to circuits, but because the price of voice service has little to do with the cost of providing the service.

The price has been manipulated by regulations promulgated to provide universal service, life-line service and a myriad of other "good" things. The price also is inflated by federal, state and local taxes as well as Federal Communications Commission-mandated line charges.

In addition, the phone companies have been operating in a regulated environment where an additional cost to provide the service translates into additional profit due to the guaranteed profit margins.

Sadly, if this integration process reaches any significant scale, I predict those who tapped the phone revenue to do good deeds will find a way to maintain their revenue stream. This would negate much of the savings from any integration.

Disclaimer: Harvard is an aggressively decentralized organization and, so far, does not relate well to integration concepts. So these opinions are my own.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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I am thinking about using redundant Cisco Systems, Inc. 1601 routers and T-1 connections to provide Internet access for users on a 10M bit/sec Ethernet network. The routers will handle one T-1 each and be configured for IP only with static routes, so I suspect between 8M and 16M bytes of RAM should be adequate. This configuration needs to be robust as it will provide content to clients who demand low downtime and high throughput and possibly corporate Internet access at lower priority if excess bandwidth is available. Will this router hold up to heavy traffic?

Via the Internet

The 1601 should be able to handle this kind of load, but I have several recommendations for your configuration. First, you may want to look at a Cisco 2500 router or higher model if you're going to be doing a lot of routing internally. Second, get the local telephone company installing the local loop portion of the T-1 to use disparate routing for protection against a circuit cut or other failure.

Using one router for each T-1 presents some challenges in terms of specifying a default route. If you don't use the Dynamic Host Configuration Protocol, you may want to look at front-ending the routers connecting to your Internet service provider with a twin configuration of Cisco 2501 routers with dual-port Ethernet. In conjunction with Cisco's Hot Standby Routing Protocol, this configuration will allow you to give a single image of your network to the users and provide fault-tolerance.

Managing Internet access is more involved. Restricting access to times of excess bandwidth will be difficult. You may want to look at Novell, Inc.'s Border Manager for Internet access control. It would allow you to limit access by protocol and by users or groups of users. You also should implement a proxy server to control the amount of inbound access that is available from the Internet to your network.

Plotting a course for deploying Gigabit Ethernet

Gigabit Ethernet can be deployed a number of ways. Which is best for you?

By Kevin Sheehan

As today's computers become powerful enough to overwhelm their network connections, and new networking applications drive the demand for gigabit-level bandwidth, the network you installed two years ago is likely to run out of steam.

Common bandwidth drivers include rich data with graphics content, the move to high-performance IP infrastructures, data warehousing, high-speed backup systems and server farming.

Unfortunately for the IT professional, the proliferation of new technologies and products presents a confusing picture. Faced with both current and future network demands, network managers must establish well-calculated integration plans to maximize benefit while minimizing risk.

Gigabit Ethernet, with the proper deployment strategy, offers one of the best balances between risk, reward and investment protection.

UP CLOSE

A plan for getting into Gigabit Ethernet

Migrating legacy networks or applications to new digs can be a harrowing experience. Installing Gigabit Ethernet products is no different. Here are a few simple suggestions for moving Gigabit Ethernet technologies into your network with minimal risk.

Step 1: Supercharge a few power or specialized workgroups. This low-risk step allows you to quickly take Gigabit Ethernet equipment out of the lab and into production.

Step 2: Interconnect power workgroups to form a shadow backbone that parallels your mission-critical backbone. This permits operations staff to become more comfortable with the new technology, equipment and network management.

Step 3: After gaining experience with the shadow network, begin integration into the LAN backbone. Final implementation involves well-calculated extensions to the other areas of the network, including the wiring closets and server farms.

Once you are ready for Gigabit Ethernet, the next step is to determine how and where you should deploy it.

An obvious application is in the mission-critical backbone. However, few network managers are willing to risk immediate deployment of a new technology in such a critical area.

The key question becomes: How do you quickly move Gigabit Ethernet from the evaluation lab to the backbone without requiring a forklift upgrade and taking unnecessary risks?

The optimum deployment strategy can be found by examining the risk/reward trade-off of various deployment alternatives.

Any migration strategy must guarantee the following: seamless integration, minimal network disruption and a quick return on investment.

With these criteria in mind, there are three primary deployment paths for Gigabit Ethernet: power workgroup upgrades, link upgrades within a wiring closet and server link upgrades.

Paths to the backbone

First of all, you could immediately deploy Gigabit Ethernet technologies within the wiring closet. A typical wiring closet connects hundreds of users to the backbone.

Most network managers consider this a high-risk strategy. The closet is a mission-critical part of their network, and managers believe that placing a large number of end users on first-generation Gigabit Ethernet equipment and technology represents a big gamble. Not only is the risk high, but the short-term reward likely is limited.

You could deploy Gigabit Ethernet products on servers and adjacent backbone links. This requires the network manager to immediately upgrade not only core server links but also the backbone itself. This implementation places the company's mission-critical traffic on first-generation equipment and new technology — another high-risk approach.

The key question becomes: How do you quickly move Gigabit Ethernet from the evaluation lab to the backbone without requiring a forklift upgrade and taking unnecessary risks.

The potential reward at the servers is high, but before integrating a new technology, it is important to evaluate and locate the real bottlenecks.

For example, are the bottlenecks deeper in the backbone? Are they within the servers themselves? Are they application related? With these issues clearly researched and understood, Gigabit Ethernet deployment through enterprise servers can yield high returns.

This path is characterized by high risk with potential high reward.

Finally, you could target power workgroups with Gigabit Ethernet gear.

This alternative leads you into high-end workgroup environments that can benefit from greater than 100M bit/sec to the end-station.

These specialized workgroups are traditionally client/server-based and can be found in almost any company, usually coexisting with transaction-intensive applications, such as graphic design, point-of-sale tracking and analysis, and CAD/CAM environments.

This path gets Gigabit Ethernet technology quickly out of the lab and into the production network. Even though it's a production network, only a small number of the most sophisticated and demanding users are affected by the new equipment.

These demanding users benefit immediately from the increase in workgroup and local server bandwidth. Deployment through the power workgroup follows a well-calculated, multistep process rather than the one-step forklift upgrade required by the other paths. This path provides the best risk/reward ratio.

Ultimately, network managers need to satisfy the needs of bandwidth-hungry users and allow operations staff to gain real experience in preparation for wider deployment.

Ideally, a well-planned migration will provide a practical opportunity to evaluate essential networking architecture options.

Those options include wire-speed Layer 3 routing, quality-of-service solutions for intra- and interdevice prioritization of traffic, and IP-based virtual LAN solutions — without risking your overall network operation.

This high-reward and low-risk upgrade path gives immediate benefit to end users, without jeopardizing the rest of the network.

Sheehan is product manager of switch products with Packet Engines, Inc. He can be reached at kevins@packetengines.com.

Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Michael Cooney by phone at (508) 875-6400 or e-mail at michael_cooney@nww.com.

EDITORIAL *insights*

Memo to Bob Allen: Carpe Diem

To: Robert Allen, CEO, AT&T

Mr. Allen, AT&T is in a funk, competitively and financially. Your leadership is in question, and people are wondering what you're willing to do to kick up AT&T's energy level and market position.

Here's my suggestion: Stun everyone by upstaging the WorldCom/MCI news. Merge with WorldCom yourself.

Sound crazy? It isn't. Really. Bernard Ebbers claims to have approached you already about a merger — a proposal to which you reacted coolly, he says. So the brash, gutsy WorldCom CEO already sees some merit in teaming up, and he would bring a lot to your table.

Not only would WorldCom shore up your sagging share in the long-distance market, it would give you incredibly valuable Internet assets, including UUNET and now ANS Communications and CompuServe's network group. Equally important: WorldCom's local loop operations, including MFS Communications and now Brooks Fiber Properties.

Most significant of all would be the aggressiveness and competitive spirit Ebbers and his team would bring to AT&T — a company that sorely needs an infusion of fighting spirit right now. Ebbers would make a hell of a successor, a fact that wouldn't be lost on Wall Street.

Consider also that cutting a deal with Ebbers would block an MCI/WorldCom merger, and a partnership like that would be big trouble for AT&T. It's one thing to talk about BT and MCI in international networking. It's another thing entirely to face a combined MCI/WorldCom in the Internet, local loop and long-distance markets right here in the good ol' U.S. of A. Combine two of the most aggressive companies in the business, Mr. Allen, and you have a recipe for big headaches.

What's more, acting swiftly to partner with WorldCom would be the best public relations move you could make. AT&T would come off as the aggressor, rather than looking like it was being forced to react by more nimble companies. And you need that PR boost.

Sure, this would be a huge deal to pull off, and it would only work if Ebbers was willing to make a go of it (are you still willing Bernie?). He might be, in order to avoid the delays involved in breaking up the BT/MCI deal and the big financial risk of continuing to issue stock to fuel his acquisition engine.

But you can swing this deal, Mr. Allen. You've already engineered the divestiture of Lucent and NCR, and you explored that $50 billion merger with SBC. You know AT&T needs a strong partner now. So unless you've got a deal for Sprint or GTE quietly moving ahead, seize the day. Give Ebbers a call.

John Gallant, editor in chief *jgallant@nww.com*

Venture over the Horizon • *Kevin Fong*

Preparing your network for electronic commerce

There's been a lot of attention focused on electronic commerce over the Internet and business models for selling products and services to consumers. The world's leading electronic merchant is Cisco Systems, which has done approximately $1 billion in sales over its business-to-business Web commerce site. The fact that Cisco's customers have shown not only a willingness but a genuine enthusiasm for purchasing $200,000 routers online should serve as a wake-up call for any company that believes its products are too expensive or complex to sell over the Internet.

Using the Internet for business-to-business transactions may not involve direct selling. Some companies use the Internet like an electronic data interchange system to automate communications with suppliers.

A start-up, CrossRoute Software, soon will begin shipping software that automatically sends purchase orders, engineering diagrams and manufacturing instructions to a company's supplier.

Another approach is to put up on the Internet a searchable catalog of products to assist customers in making buying decisions. National Semiconductor, which put up such a catalog of its more than 40,000 products, discovered a side benefit: The information generated by visitors to the site can be used not only to make sales, but to help forecast demand.

Helping companies deal with the network issues raised by electronic commerce presents an investment opportunity, particularly in the area of software. For electronic commerce to realize its full potential, users need software and systems that provide improved security and reliability, better integration with existing legacy systems and enhanced ease of use, including more personalized selling.

A number of start-ups are rising to the challenge. Calico Technology, for example, has developed software that acts as a sales expert, guiding customers to the products and configurations that best suit their needs. The package, called Concinity, can be used by mobile sales representatives or to support a vendor's call center and customer service operation. The software takes a user step by step through available choices that fit his or her particular requirements. When a configuration is completed, or at any point during the process, quote screens allow the user to view the items ordered and add other items, such as shipping options or spare parts.

Another start-up, Instill Corp., has developed an easy-to-use electronic commerce service called e.store, which is specifically tailored to the food service industry. By allowing food service operators and distributors to exchange product catalogs, purchase orders, confirmations and invoices electronically, e.store helps improve productivity, strengthen relationships with key suppliers and reduce operating costs.

A third new firm, BroadVision, provides software to individualize sales and marketing on the Web. BroadVision's One-To-One Commerce package of turnkey applications allows users to manage content, customers, incentives and transactions using server-based software modules.

No commerce site can substitute entirely for the human relationship. But selling on the Internet can make it easier to reach customers by providing them with a sales channel that can be accessed on demand.

With all of the software and services now being offered to enable business-to-business electronic commerce, there is no reason why any company, large or small, should not take advantage of the Internet's unique capabilities as a sales channel. More importantly, business-to-business commerce over the Internet soon will become like voice mail and e-mail are today — a required sales tool. Now is the time to start.

Fong is a general partner of Mayfield Fund, a venture capital firm based in Menlo Park, Calif. He can be reached at kfong@mayfield.com.

MESSAGE QUEUE

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

Defending token ring

Mary Petrosky's column "High-Speed Token Ring: More Band-Aid than boon" (Sept. 22, page 45) offers misleading advice on the most cost-effective and intelligent migration path for the installed token-ring base.

When it comes to improving token-ring network performance, comparing the cost of Ethernet gear to token ring is like comparing apples to orange marmalade.

For new installations, as Petrosky states, Ethernet is clearly the more sound choice, based on economics alone.

But for token-ring users, ripping out token ring in favor of Ethernet based on

Above the Cloud • James Kobielus

A protocol for clogged intranet arteries

Fresh content is the lifeblood of the World Wide Web, but it also is the cholesterol that clogs the arteries of many intranets.

Every time we download a Web page we've seen before or have an automated spider crawl a familiar Web site, we contribute to the problem. Typically, we retrieve an entire document or a set of Web pages from a particular URL when we only need to fetch the information that has been updated since our last visit.

What results is the downloading of redundant information, which wastes precious bandwidth, disk space and CPU cycles throughout the intranet. Proxy servers and push browsers only partially address this problem.

Now Marimba, Netscape, Novell and Sun have proposed a simple, elegant solution and submitted it to the World Wide Web Consortium for standardization.

The proposed Distribution and Replication Protocol (DRP), operating over HTTP connections, would ensure that only new pages or changes to existing pages are downloaded to the requesting browser, application, proxy or Web site.

Before accessing the desired pages or documents, the client first would retrieve an index that, when compared with a prior index cached locally, indicates which leaves on the site's data structure tree have been added, removed or changed.

In fact, users rarely would need to download entire indices because DRP allows them to download only incremental index updates, further reducing the network load. Even the most complex incremental downloads from a given site may require no more than a single TCP connection.

The fundamental beauty of DRP is that it can identify updated files efficiently without having to open, convert and catalog the files, generate full-text indices or otherwise muck around in the extensive file-related metadata that operating systems and document management software normally maintain.

DRP-compliant servers would use a hashing algorithm such as RSA Data Security's Message Digest 5 to compute a checksum for each file. The checksum would be based on the string of bits that compose the current version of that file, regardless of whether the file is in HTML, Portable Document Format, Microsoft Word or some other format.

Any modifications to the underlying file would produce a correspondingly different checksum. Indices would consist of Extensible Markup Language-formatted files that associate file URLs with checksums. (You can retrieve the current draft of the DRP proposal from www.w3.org/TR/NOTE-drp.)

MARTY BRAUN

Unfortunately, Microsoft has chosen not to support the DRP proposal. Instead, the Redmond, Wash.-based software giant has thrown its weight behind the Internet Engineering Task Force's (IETF) complementary, much more ambitious World Wide Web Distributed Authoring and Versioning (WEBDAV) standards effort and has disparaged DRP as a "toy solution" to the problem of file replication on the Web. (You can find the current WEBDAV draft specification at http://globecom.net/ietf/draft/draft-slein-www-dist-author-00.shtml.)

Microsoft's abstention from the DRP effort is shortsighted and self-defeating because, as even the company admits, DRP is a subset of the WEBDAV effort, which may take years to slog through the IETF's extensive comment and revision process. We need DRP — which has been market-proven in the context of Marimba's Castanet technology — as soon as Netscape, Microsoft and other intranet software vendors can support it.

Microsoft's refusal to support DRP also is antithetical to the can-do spirit of the Internet community, which propelled TCP/IP to commercial ubiquity back when Open Systems Interconnection proponents were content to duke it out in elite committees. WEBDAV, for all its complexity and sophistication, smells like OSI for the '90s.

It is perhaps a bit too ambitious in its attempts to turn the Web into a sort of distributed file system with its own file authentication, manipulation, locking, check-in/check-out and version-control mechanisms.

WEBDAV looks like a tough five-to-10-year sell to a volatile industry in which many vendors will be lucky to survive into the next fiscal year.

DRP, on the other hand, is the sort of standard that Web software vendors can implement in their next product upgrade cycle.

The sooner we implement DRP, the sooner we will be able to hold back the deluge of redundant Web downloads that threaten the stability of intranets everywhere.

Intranet managers should throw their united weight behind DRP. If users speak as one, even a vendor as powerful as Microsoft will swing our way.

Kobielus, a contributing editor to Network World, *is a senior telecommunications analyst with LCC International, Inc., a McLean, Va.-based network design, engineering and integration firm. He can be reached at (703) 873-2474 or at kobielus_james@lccinc.com. The opinions expressed are his own.*

cost alone is a shoot-yourself-in-the-foot strategy — especially in light of the next-generation token-ring technology available today that can extend token ring's productive life well into the future.

Petrosky accurately points out that many networking vendors will continue to invest more heavily in Ethernet technology than token ring, an inevitable result of market dynamics. However, this hardly means that token-ring users also should abandon the technology that has served them well for many years. Many vendors maintain a strong commitment to driving the advancement of token-ring technology.

Finally, Petrosky points to the absence of Layer 3 switches in the token-ring market as evidence of an outdated technology. This is because Ethernet's poor bandwidth utilization has created the need for these devices much sooner than in the token-ring world. Token-ring Layer 3 switches are on the way and will play a vital role in token ring's long-term strategic migration direction.

Jorgen Hog
Vice president, networking product marketing
Olicom, Inc.
Plano, Texas

Petrosky responds: The column's intent was to get users to question whether token ring continues to be the right choice for them. Many of token-ring's features, such as its token-passing scheme and related management functions, are moot in a full-duplex switched environment, leaving source routing as token ring's main value-add, compared to Ethernet.

Likewise, as users deploy IP and IP-based services, Layer 3 switches will play a key role in the network infrastructure — whether that infrastructure is token-ring- or Ethernet-based.

Di and nets don't mix

I am amazed at the ability of the "mainstream" media to differentiate themselves from the so-called irresponsible tabloid media. What is so different about *Network World* putting a rather large picture of Princess Diana on its cover with the silly headline "A crying shame" and Web sites profiting from her death?

You may think there is quite a substantial difference, but I assume *Network World* is making money on the magazine.

Try not to be so arrogant and self-righteous the next time you pass judgment. Your displaying a picture of Princess Diana on your cover reeks of the sensationalism you condemn.

It was the last picture I expected to find on your front page. And frankly, it disappoints me.

Terence Shea
Assistant director
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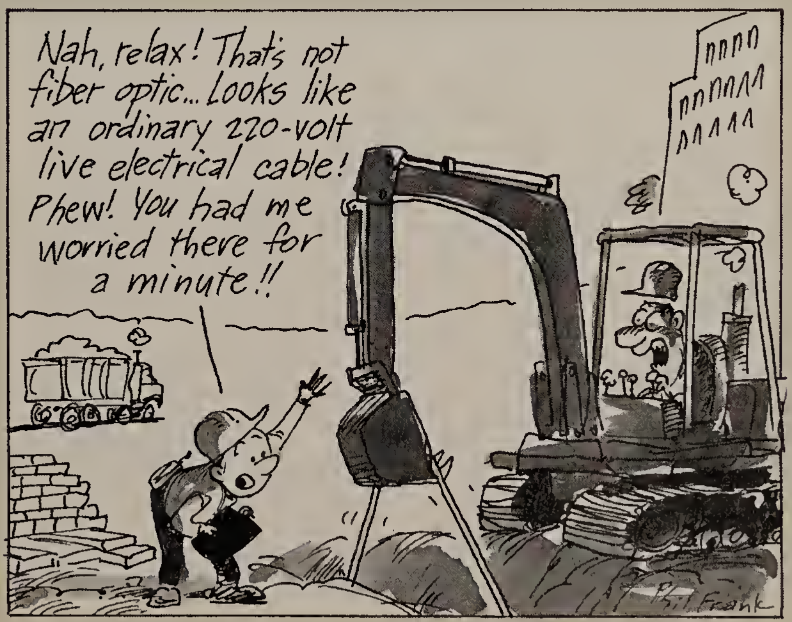
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Phil Frank

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*Circle Reader Service #***47**

HEAD *to* HEAD

NC or NetPC: Which is the better approach?

NC: Java-based thin client

BY DAVID SIMMONS, Sun Microsystems, Inc.

Much like the concept of the hybrid copier/printer/fax machine, the NetPC offers too little and too much.

While the NetPC addresses one critical issue facing today's corporations — the theft of company information — it does so by removing the floppy and CD-ROM drives of an otherwise competitively featured PC. But you gain no increased value in network architecture, service or support costs. When the new version of the operating system arrives, you'll also have to go from desktop to desktop, upgrading the hardware and software.

Sound like the PC of today? It should, because it is.

So, it is no surprise that companies such as IBM have scrapped their NetPC plans while remaining committed to the continued development of Java computing and network computers (NC) in the enterprise. There is no market for the NetPC, and those who buy them will have to revisit this issue in another few years — maybe even a few months — with the arrival of Windows 98.

Designed as an alternative to the traditional PC, the NC is ideally suited for dedicated applications such as call center operations, dumb terminal replacements and retail kiosks. In fixed-function environments such as these, the PC is overkill. Fat clients are not only more expensive to purchase, but also more costly to maintain.

Sun Microsystems, Inc.'s NC, the JavaStation, has a local scalable processor architecture (SPARC) processor and up to 64M bytes of memory to run Java-based applications locally at maximum performance with minimal impact to the network. User configuration, systems administration and software distribution for NCs take place on the server, where the IS department can more effectively monitor and manage these processes in a centralized location. NetPC desktops require a visit from the IS department to complete each of these tasks.

NC users can customize their personal Java computing environments, enabling access through any device on the network. But unlike fat clients, there are no moving parts, storage or hard disks to service locally on the NC desktop. If the hardware fails, the machine can be replaced, and the user can be up and running immediately with full access to his personal network environment and necessary applications as if nothing had happened. You can't do that with a NetPC.

Additionally, NC users can take advantage of application and system upgrades simply by turning on the machine and logging on to the network. System software installations only need to happen once — on the server — in order to provide desktop users instantaneous access to the most recent version. You can't do that with a NetPC.

Finally, IS departments love the Java computing foundation of Sun's NC because its "write-once, run-anywhere" capability means no more porting code and rewriting for every platform. The NC integrates seamlessly into IS infrastructures — it's a true team player. You can't do that with a NetPC.

Companies are looking to thin-client technology as a way to reduce IT costs, increase productivity and deliver greater flexibility, reliability and functionality to users. You can't do that with a NetPC.

Simmons is technology manager of Sun Microsystems, Inc.'s Desktop Solutions Group. He can be reached at david.simmons@East.sun.com.

NetPC: Windows-oriented diskless PC

BY ADAM TAYLOR, Microsoft Corp.

The network computer (NC) is not a cure-all for reducing IT costs. NC vendors are in business to make money — not on inexpensive thin clients, but on the expensive servers you will need to run them.

What's more, NC vendors cannot agree on a compatible specification, which leads to a fragmented array of incompatible devices that will end up costing you time and money. Each NC has a different client operating system, back-end server requirements, management tools and user interface. Some NCs even require proprietary monitors.

Unlike Windows-based PCs, NCs lock you in to only one type of device and vendor (because NCs don't interoperate) and don't provide Windows-based application support without Windows NT Server.

The NC debate, however, has done one thing well: It has put the spotlight on the need for all vendors to shoulder the burden of reducing total cost of ownership (TCO) for customers. Microsoft is committed to doing just that with our Zero Administration for Windows (ZAW) vision. Our goal is to reduce the cost of deploying, using and managing computers by developing more intelligent software and helping our partners build more manageable hardware.

Think about it. Do you want to replace your current investment in computing technology with an incompatible device that still requires Windows NT Server for Windows-based applications? Or would you rather see Microsoft make Windows easier to deploy, support and manage so you can build on your current investments?

With Windows NT 5.0, targeted for beta 2 release next year, we will introduce IntelliMirror, a technology designed to bring you the best of both centralized and distributed computing. IntelliMirror will allow users to roam anywhere on or off the network while retaining access to their data, applications and computer preferences. In addition, IntelliMirror will allow you to deploy any application to any user or group of users automatically, without having to visit any desktops. And because each user's critical information is kept safely on the server, all files can be blasted down to a new PC if the current PC should fail.

The ZAW vision also includes the introduction of new types of manageable hardware, including the NetPC and Windows-based terminal. The NetPC is simply a PC with a high degree of manageability built in. By eliminating end-user futz and adding in powerful manageability components, the NetPC dramatically brings down costs.

We also are introducing Windows-based terminal support in a new product code-named Hydra. This will work where NCs fall short, providing Windows-based application support on a thin client without introducing the costly complexities of an additional NC back-end server infrastructure.

Look at the thin-client solutions coming to market and carefully evaluate all the costs in terms of hardware, software, compatibility with existing and future investments, support and worker productivity. Then learn how Microsoft offers the best of both worlds — a rich Windows-based experience and the lowest TCO (www.microsoft.com/windows/innovation/). Your choice will be clear.

Taylor is Microsoft Corp.'s Windows group product manager. He can be reached adamct@microsoft.com.

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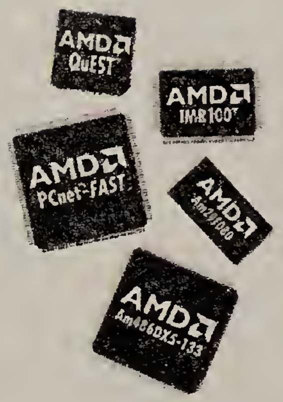

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BUYER'S GUIDE

ATM BACKBONE SWITCHES

Look for longevity

With standards still evolving, you'll need to ask some probing questions to find the switch that will serve you best.

By Edwin Mier

NANCY POPPER

Your network is begging for more bandwidth, and you just can't put off upgrading any longer. You've checked out all the options and decided that ATM is the way to go. Now you've got to pick a switch, one that will see you through the long haul.

With this problem in mind, we offer the Buyer's Guide to ATM LAN Backbone Switches.

To get started, check out the **Issues and Trends** story below for guidance on what to look for in an ATM switch, including how to ensure it will evolve to incorporate key standards now under discussion.

You'll also need details on the kinds of ATM backbone switches most likely to be deployed in a private network — those with 32 or fewer 155M bit/sec interfaces. **The Product Chart** beginning on page 88 has the lowdown on the 14 switches we turned up.

If you don't see the model or features you're interested in, turn to Network World Fusion at www.nwfusion.com for an expanded version of the chart along with our Interactive Buyer's Guide. The interactive version lets you find products that meet the buying criteria you select.

Naturally, you won't want to sign a purchase agreement until you know how the devices work in the real world. We brought two ATM backbone switches into the lab and evaluated them for features, management and administration, performance, and installation and configuration. We found the speed demons were complex creatures — see the results of our scrutiny in the **Review** that begins on page 78.

ISSUES AND TRENDS

ATM is a technology in transition. Standards are still evolving and, like it or not, so are today's ATM switches.

That's not to say ATM is unstable or that it's too early to deploy ATM nets. In fact, the upside of all this change is improved features and functions that are making ATM more efficient and capable. But the downside is the huge toll it exacts on multivendor interoperability and backward compatibility.

The upshot is that you need to consider several future-proofing factors when you're selecting an ATM switch, such as the following:

New or added processing requirements

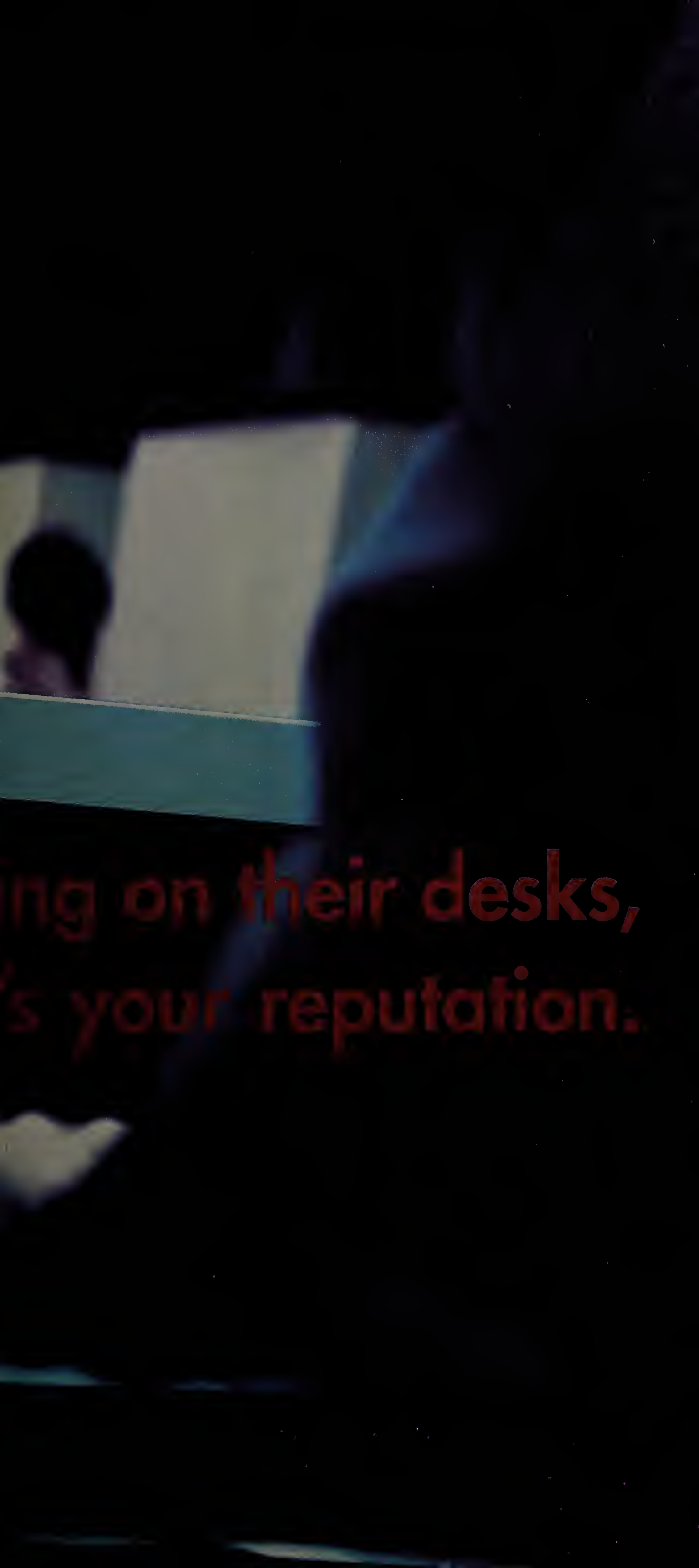
Newer ATM features, such as switched virtual circuits (SVC), may demand much more of the ATM switch-control infrastructure than earlier permanent virtual circuits (PVC). Few ATM switches built more than a year ago were designed to handle high-volume SVC call processing.

Scalability of switching fabric

A year or two ago, a switching capacity of 2.5G bit/sec seemed ample for any future contingency. But bandwidth is addictive. Now switches are built to grow modularly and support expanded capacities of 10G bit/sec and beyond. But switch

See **ATM,** *page 78*

MMX
intel inside
pentium II
COMPAQ
That isn't a computer you're pu



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COMPAQ

ATM, *continued from page 75*

architectures vary significantly; expandability can have serious unwanted side effects, such as blocking and latency.

Support for old and new standards

As revised or newly defined ATM standards are adopted, switch software invariably will need to be updated. Successor standards that aren't backward compatible — the call setup specifications of the User-to-Network Interface (UNI) 3.0 and 3.1 Versions, for example — concurrently may need to be supported through the foreseeable future.

Determine the switch's role

Some ATM switches are built for use by carriers, and others are designed for private networks and customer premises. The mechanics and technology of ATM-based cell switching are essentially the same for every device, yet vendors configure and package ATM switches for carriers and private networks somewhat differently.

Part of this distinction is historical. Prominent switch makers that traditionally targeted the carrier/telco central office marketplace are continuing that thrust with their latest brand of high-end ATM switches. These products tend to be modular, feature more redundancy options, support only WAN-oriented ATM interfaces such as ATM over DS-3 and T-1, and come with special software for detailed call accounting.

Head to Fusion for additional product listings and features and a bonanza of other resources.

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The biggest distinguisher of the carrier/telco ATM switch marketplace usually is price. These units carry the highest per-port price tags, as well as the highest profit margins — especially for vendors who sell to local phone companies.

Then there's the private sector. ATM switches take on several different flavors here.

Backbone switches (profiled in the chart on page 84) tend to interconnect other switches instead of directly linking end users. Comprising the core of an ATM network, backbone switches have many responsibilities. They need to address high switched call volumes in some environments, but in others they're charged with handling largely static connections. Backbone switches need to be prepared for a range of traffic loads and a large number of logical paths, as well as changing topology requirements.

Workgroup switches handle direct station connections. These connections can be made via ATM or, more commonly, via an organization's existing LAN.

Legacy LAN-to-ATM switches, commonly known as edge switches, let LAN workstations connect to an ATM backbone via one or more ATM uplinks. The term edge switch also has been used to refer to switches that connect a private network or other premises equipment to a carrier's wide-area ATM network.

Legacy LAN-to-ATM switches can be considered a subset of workgroup switches because they're always handling data-only traffic and a fixed maximum number of client workstations, depending on the legacy LAN technology.

When it comes to throughput and the number and type of supported LAN interfaces, legacy LAN-to-ATM switches are a diverse lot. Many edge switches aren't even cell switches; they're traditional frame- or packet-based store-and-forward switches, such as FORE Systems, Inc.'s ES3810. These poorer cousins are traditional frame- or packet-based store-and-forward switches with one or more uplinks (usually ATM OC-3 155M bit/sec) to connect to an ATM backbone switch.

How much is enough?

Sizing an ATM switch requires an accurate assessment of current requirements and future expansion. ATM costs appreciably more than alternative technologies, so you'll want to retain your investment in ATM technology longer. Plan to grow the ATM switch's capacity to last more than the five or so years that a typical switch investment is amortized.

Projecting your ATM bandwidth requirements for seven or 10 years, however, is difficult. The rule of thumb for packet data used to be that you could plan bandwidth requirements to double every five years. But measuring ATM bandwidth is a little different.

Unlike traditional shared-medium LANs, such as Ethernet and token ring, ATM is almost always full-duplex; that is, ATM connections entail separate paths for transmitting and receiving. But a full-duplex 100Base-T connection works pretty much like an ATM link.

A 155M bit/sec ATM link equates

See ATM, *page 88*

High complexity, high performance

ATM switches from FORE and Xylan demonstrate their speed on the backbone, but complexity remains a stumbling block for would-be implementors.

By Edwin Mier, Robert Smither and Thomas Scavo

You'll need a little more than an afternoon to install an ATM backbone network in your organization. How much more? Well, two or three years ought to do it.

Vendors of ATM equipment have a way to go before ATM installation and configuration can be considered "plug and play." Even the prominent network vendors that visited our labs to show off their ATM stuff — FORE Systems, Inc. and Xylan Corp. — have some work to do in making their ATM gear more user-friendly.

REVIEW

The ATM switch implementations of FORE, the unquestioned ATM market leader, and Xylan, which has enjoyed great success with its mixed-technology OmniSwitch family, probably are alike in more ways than they are different (see graphic, page 84).

We got screaming performance from FORE's ASX-1000 ATM cell switch, which used its own brand of high-throughput ATM network interface cards (NIC), in concert with its equally high-performance ATM and 10/100Base-T switches. If FORE has a weakness, it's in its current class of ATM management offerings, which still are too tedious and complicated.

Xylan has done a good job adding ATM to all the other network technologies it supports. Performance using Xylan's Omni-9x OmniSwitch across a Xylan mixed environment of 10/100Base-T and ATM is good, although the different pieces needed to make ATM work are cumbersome to configure and complex to understand and manage.

Size-wise, FORE's ASX-1000 can be expanded in 2.5G bit/sec switch-fabric increments to yield a total of 10G bit/sec of switching bandwidth. Correspondingly, Xylan's switch can interconnect up to eight 1.6G bit/sec ATM cell-switch modules over its 13G bit/sec passive backplane. Both switches handle a maximum of 64 155M bit/sec ATM ports.

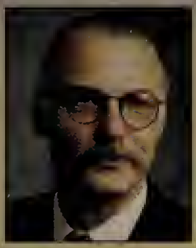
For interconnecting with 10/100Base-T LAN environments, both vendors offer a specially configured modular switch with multiple 10/100Base-T switch ports and one or more ATM uplinks. In either vendor's case, stations on Ethernet or Fast Ethernet connect over ATM using the vendor's LAN Emulation 1.0 (LANE) implementation. This is where the 10/100 switch contains a LAN Emulation Client (LEC) and establishes individual switched virtual circuits (SVC), which are bridged connections between Ethernet/Fast Ethernet devices and devices on the ATM network.

From this high-level view, there's more than a little functional similarity between the two vendors' products. Indeed, the products' overall ratings are not that far apart. But the devil is in the details.

During our testing, a problem cropped up in a different component of each vendor's equipment setup. In FORE's case, it turned out to be a module in the ES-3810 legacy LAN switch. In Xylan's case, it was a switching module in the OmniSwitch chassis.

Network components do fail from time to time, but the troubling part was that even when using all of the vendors' management wares, we couldn't readily figure out what was wrong. In each case, traffic flow between the legacy LAN and the ATM backbone had stopped or slowed to a crawl. But neither the vendor's management station nor the switch's console interfaces gave us a clear indication of the problem.

See Review, *page 82*



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Whether you need a firm understanding of networking technologies and applications or require a comprehensive update of current trends, this invaluable seminar will meet your needs. Packed with insights, **Essentials of Networking and Data Communications** is both informative and entertaining. This two-day seminar is developed and directed by Ray Horak, an internationally acclaimed network consultant, author and lecturer. As well, interactive case studies are interwoven through the seminar in order to illustrate the meaningful application of the critical technologies presented.

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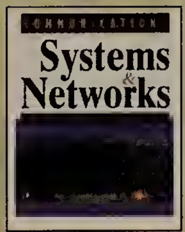

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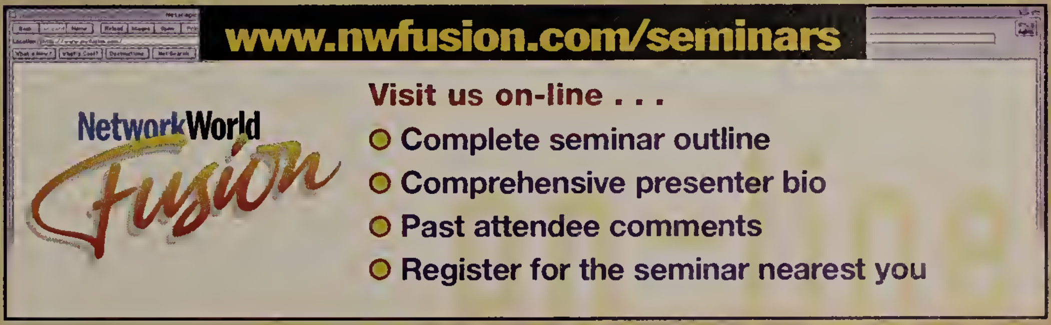

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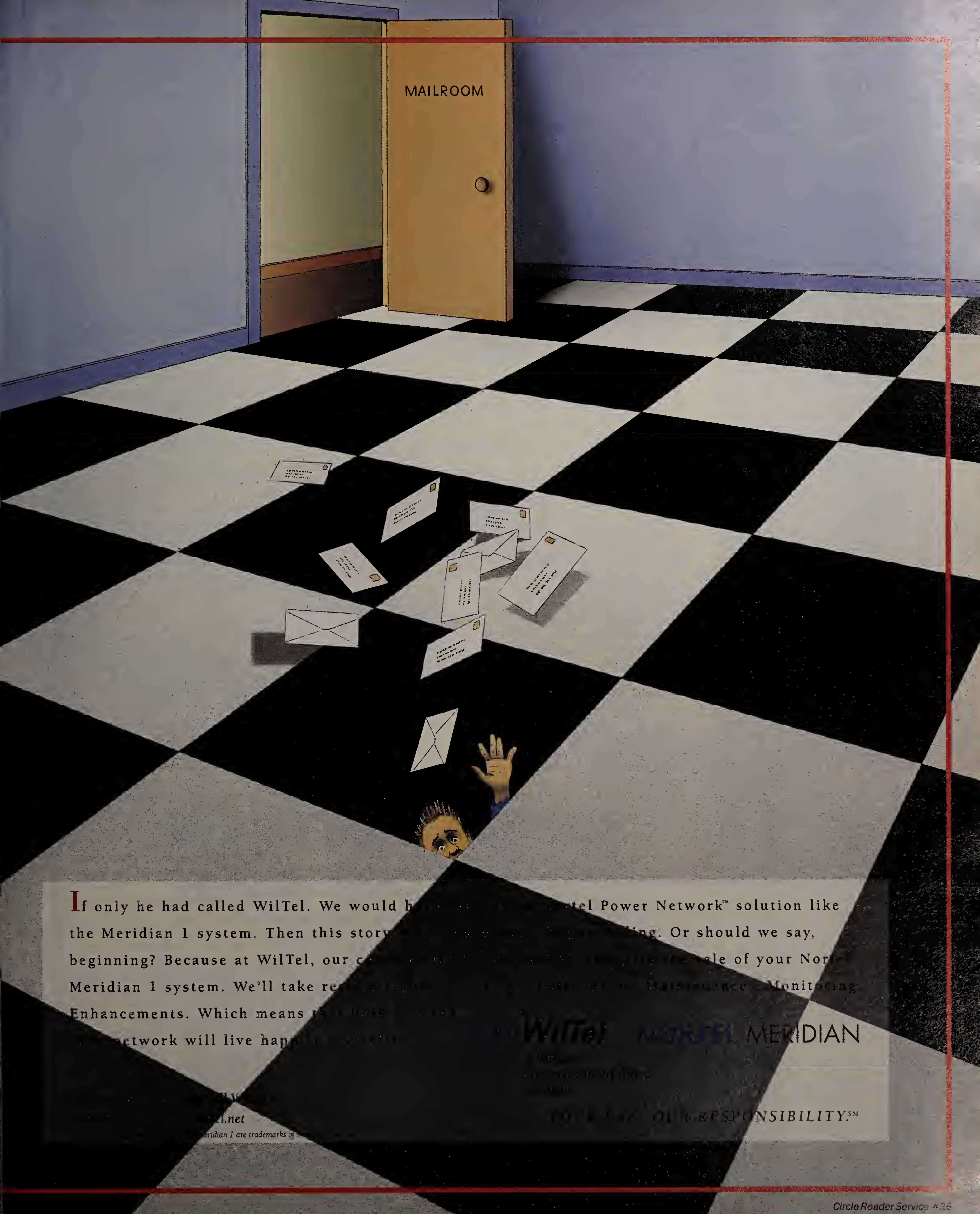

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Score Card

	Features (25%)	Management and administration (25%)	Performance (25%)	Installation and configuration (25%)	Total score
FORE ASX-1000	7 x .25 = 1.75	7 x .25 = 1.75	8 x .25 = 2.0	8 x .25 = 2.0	7.5
Xylan Omni-9x OmniSwitch	7 x .25 = 1.75	7 x .25 = 1.75	8 x .25 = 2.0	7 x .25 = 1.75	7.3

Individual category scores are based on a scale of 1-10. **Percentages** are the weight given each category in determining the **total score.**

Net Results

	PROS	CONS
ASX-1000 *FORE Systems, Inc.* *(412) 772-6600* *www.fore.com/products/swtch/asx10-2.html*	▲ Simplified setup of initial emulated LAN (ELAN) ▲ Offers complete line of ATM gear: NICs, edge, workgroup and backbone switches ▲ Supports diverse ATM interfaces ▲ Solid performance, especially NICs	▼ Documentation, online help and command-line interfaces are not user-friendly and assume the user knows a lot about ATM ▼ Management application is tedious and needs to be simplified
Omni-9x OmniSwitch *Xylan Corp.* *(818) 880-3500* *www.xylan.com/products/OMNI/OMNI.HTM*	▲ Rich set of options for VLAN setup, including ATM ELANs ▲ Can mix 10/100Base-T, FDDI, token ring and ATM in same ELAN/VLAN ▲ Solid performance	▼ Separate server system required for LANE and ATM IP services ▼ Command-line interface of switch is rugged and nonintuitive ▼ Packet-to-cell throughput is currently limited to 960M bit/sec

Review, *continued from page 78*

We finally found and fixed these problems, using mainly a trial-and-error approach. That's fine in a small lab network, but it doesn't scale well to a large distributed real-world network.

At the FORE front

Minor glitches aside, FORE has its ATM act together more than any other vendor does. But users unfamiliar with ATM will still find there's quite a learning curve to scale.

The first evidence you'll see is the arcane and nonintuitive command-line interface (CLI) to the ASX-1000 switch. FORE is working to simplify the setting of ATM parameters to make the process easier for novices. Indeed, FORE has implemented a set of default parameters so that with relatively few commands the user can invoke and activate an initial emulated LAN (ELAN), which might be considered the ATM equivalent of a LAN switch-based virtual LAN. However, a network of any size likely will soon outgrow this initial ELAN. And modifying an ELAN or adding subsequent ones entails learning more about ATM than most people really want to know.

We learned early in this testing that mixing an ATM network with a legacy 10/100Base-T network, while potentially appealing from a cost and migration point of view, yields poorer performance than a network that's all ATM, end-to-end. That's because whenever you connect an ATM ELAN to a legacy 10/100Base-T network, the whole ELAN is constrained to Ethernet's maximum packet size of 1,500 bytes.

It's only when all communicating stations are ATM-attached that you can really hike performance by expanding the packet size — to 18K bytes. In FORE's case, an ELAN of all ATM-attached stations uses a 9K-byte packet size by default. In benchmarks we ran between a Windows NT Server and NT Workstation, we saw throughput increase at least 10% when operating ATM-to-ATM with a 9K-byte maximum packet size, compared with a 1,500-byte maximum.

FORE's ATM gear exhibits several notable strong points. One is that FORE offers every conceivable standardized ATM interface type, ranging from ATM over T-1 to ATM over OC-12 optical fiber at 622M bit/sec. And FORE also offers its own range of ATM NICs, which, as we found out for our Pentium 200 NT systems, are impressive performers.

In our test configuration, FORE's edge switch was one of its modular ES-3810s, which can be expanded to support up to 24 10/100 ports (or up to 72 if all are 10Base-T Ethernet). Modules in the ES-3810 aren't hot-swappable, as the modules in the ASX-1000 are. However, the command line interface for setting up and managing the ES-3810 is an order of magnitude simpler than the CLI for the ASX-1000.

FORE's main management application, ForeView (we tested Version 4.2.5), is rich in features and functions. And it's available in versions that run on most popular Unix or Windows platforms. But ForeView's user interface could be clarified and simplified. It takes a lot of screens and point-and-click actions to do almost anything. Also, we encountered numerous cases in which indecipherable ATM acronyms appeared on the screen, and nowhere in the online help were these decoded or explained.

As far as mixing legacy LANs with ATM, FORE can intermix Ethernet and Fast Ethernet or token ring with ATM.

Xylan: Any-to-ATM Integration

Xylan prides itself on letting its users connect virtually any mix of network technologies via the same backbone switches. In this regard, ATM is just one of many supported transports.

While it is possible via a Xylan OmniSwitch to interconnect workstations on dissimilar LANs — say, on Ethernet and FDDI — with stations on ATM, for performance reasons, it may not be very smart to do so.

This is because of the nature of ATM ELANs. As defined in the current LANE 1.0 standard that FORE and Xylan support, an ATM ELAN has to employ certain characteristics of some other known type of LAN, typically Ethernet or token ring. That way, the ATM side and the other LAN technology can agree on things such as the order in which bits are transmitted

Table 1: Best measured throughput (M bit/sec)

	FORE		Xylan (using ATM NICs from Interphase)	
	Total network traffic	Actual data exchanged	Total network traffic	Actual data exchanged
Windows NT Server on ATM to Win NT Workstation on ATM **Protocol:** UDP/IP **Max frame size:** 9K bytes	144	108	144	108
Windows NT Server on ATM to Win NT Workstation on ATM **Protocol:** TCP/IP **Max frame size:** 9K bytes	89.6	69.4	68.2	55.8
Windows NT Server on ATM to 3 Win95 clients on 100BaseT **Protocol:** TCP/IP **Max frame size:** 1.5K bytes	97.7	77.6	80.3	64.2

Above measurements were achieved using T/TCP software running on Intel Pentium/200 Windows NT Server and NT Workstation, and Pentium/100 Windows 95 workstations; memory-to-memory transfers (no disk I/O); no other background loads were applied. Total network traffic was measured on the server's ATM link.

NORTEL
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Nortel solidifies #1 ATM enterprise switch position with 38.6% market share.
– Vertical Systems Group, 1997

Nortel grows to #1 in frame relay enterprise switch market capturing 19.8% of the market.
– Vertical Systems Group, 1997

Nortel captures #1 position in the FRAD (frame relay access device) market.
– Dataquest, 1997

Nortel rises to #3 in the worldwide frame relay equipment market.
– Vertical Systems Group, 1997

Nortel maintains #1 leadership position in the packet switch market.
– Dataquest, 1997

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(which is different for Ethernet and token ring), the packet format and the packet's maximum length (it's 1.5K bytes for Ethernet and Fast Ethernet, 4K bytes for token ring).

A server or workstation on an ATM link has to employ a software driver to operate over an ATM ELAN, using Ethernet or token-ring rules. Stations that communicate with this station normally have to use the same rule set. If any stations use a different set of rules, their packets have to be translated and changed and sometimes segmented, such as for large token-ring packets to be carried over an "Ethernet-emulated" ATM LAN.

Xylan's OmniSwitch can perform this translation, and therefore can allow virtually any mix of stations to communicate on ATM via the same ELAN. But this can become a performance bottleneck. Xylan acknowledges this and recommends instead that for sites with dual topologies, an ATM station be configured with two ATM NICs — one logically connected to an Ethernet ELAN, the other to a token-ring ELAN.

Table 2: ATM backbone switches — Side by side

	FORE	Xylan
Model	**ASX-1000**	**Omni-9x OmniSwitch**
Configuration	Modular, 16 slots (all slots with ATM interface modules)	Modular, nine slots (one slot required for mgmt. module)
Cost of configuration as tested	$44,820 (edge switch with eight 10/100 ports, dual ATM uplinks, backbone switch with eight ATM-155 ports)	$85,500 (edge switch with 12 10/100 ports, dual ATM uplinks, backbone switch with eight ATM-155 ports)
Maximum ATM-155 port density	64 ATM-155 ports/switch (four ports per ATM-155 interface module; up to 16 such modules per switch)	64 ATM-155 ports/switch (eight ports per ATM cell switch module; up to eight switch modules per switch)
Hot-swappable modules	Yes, all interface modules and power supplies	Power supply or interface modules (when replacing with same type)
ATM switching architecture	Switch-fabric capacity can be from 2.5G bit/sec (system tested) to 10G bit/sec (in 2.5G-bit/sec increments); switching uses distributed shared memory technology	Each ATM cell switching module (up to eight per switch) has 1.6G bit/sec matrix switch fabric; switch modules connect over passive 13.2G bit/sec chassis backplane
ATM switch to switch	One or more redundant 155M or 622M bit/sec ATM links; uses proprietary protocol (switch-to-switch PNNI support will ship in Q4)	One or more redundant 155M or 622M bit/sec ATM links; uses PNNI 1.0
Classical IP (RFC 1577)	Supported	Supported
UNI 3.0	Supported	Supported
UNI 3.1	Supported	Supported
MPOA	Planned for year-end	Planned for Q1 1998
Traffic types supported	CBR, VBR, UBR (all data at present), ABR planned for 1998	CBR, VBR (real time and non-real time), ABR, UBR (default for data)
LAN Emulation implementation	LANE 1.0; ATM switch includes all necessary LANE services for moderate level of broadcast/unicast traffic; an external Sun server alternatively can be used for higher volume broadcast/unicast	LANE 1.0; currently, a separate, stand-alone device (OmniMSS) is required to provide LANE services, connects via ATM-155 port to ATM switch
Redundant links from edge switch to ATM	Yes, ATM-155	Yes, ATM-155 (622M-bit/sec uplinks planned for Q4)
LAN types supported for connection to, and over, ATM backbone	10/100Base-T (mix of Ethernet and Fast Ethernet) or token ring; no FDDI; can't mix 10/100 and token ring in same emulated LAN/VLAN	10/100Base-T (mix of Ethernet and Fast Ethernet), token ring; FDDI; all can participate in same emulated LAN/VLAN

As its ASX-1000 demonstrates, FORE has its ATM act together, although complexity remains an issue.

A noticeable difference between Xylan and FORE lies in how they've implemented ATM ELANs. FORE has built right into its switch most of the services and servers required for ATM LANE — things such as Broadcast and Unknown Server and LAN Emulation Configuration Servers (LECS). This helps hide a lot of the complexity.

Even though it's all under one cover with FORE, the processing required under ATM LANE to handle a lot of broadcast, multicast and unknown-address packets is enormous. FORE acknowledges if your ELAN involves more than a few thousand such packets per second, you may need to off-load this processing from the switch. The company offers a special software package that runs on a stand-alone Unix platform for this purpose.

When we performed this testing in August, Xylan had all the components required for ATM LANE scattered about. Some were in its ATM switch module, but others were in a separate, stand-alone system, called the OmniMSS, which adds $17,650 to the necessary configuration. Because this system is made by IBM, the command-line interface used to configure the OmniMSS is different from the one for configuring the OmniSwitch. They do have something in common: They're both nonintuitive and very difficult to learn and use. However, Xylan expected to consolidate the assorted pieces needed for ATM LANE into its own switch by the time this article is published.

Xylan's main management software for this environment, OmniVision SWITCHmanager (Version 3.1.0.3 was tested), embodies a suite of applications, some fairly intuitive and user-friendly, others not so friendly. A drawback we found early on is that we weren't able to define or add the OmniMSS stand-alone LANE server to the SWITCHmanager.

The software is organized around the concept of a group of network resources, which takes some getting used to. The vendor defines a group as "a spanning tree broadcast domain." It's not the same as a VLAN, though; there can be up to 96 VLANs defined per group.

One particularly slick feature of OmniVision is a tool called NetworkMonitor, which has the same look and feel as Microsoft Corp.'s Performance Monitor utility for NT systems.
With Network-Monitor, you can examine details of any switch port — regardless of the switch topology and LAN technology — and view activity by a wide range of parameters, set thresholds and so on.

In comparison, the homogeneity of FORE's ForeView provides a more consistent management interface. For ease of use, though, some of OmniVision's components have the edge.

Knock, knock. Who's there?

You'd think with the hype over Gigabit Ethernet thick enough to gum up your transceivers, vendors hawking solid alternatives would jump at the chance to show their stuff. Well, that turned out not to be the case when we sought ATM switch vendors for this round of lab testing.

Who's serious about ATM, and who's not? FORE, the clear ATM market leader, is. And so is Xylan, which views ATM as key technology, on par with all the others the vendor's any-to-any switches support.

What about the others? Make up your own minds. Here are the vendors we invited that quietly declined our invitation to show their mixed 100Base-T ATM solutions:

- 3Com Corp. said its top testing experts were overextended for this fiscal quarter.
- Bay Networks, Inc. said it was working on new management tools, which it was not ready to offer for review.
- Cisco Systems, Inc., which doesn't make ATM network interface cards (NIC), said it didn't want to supply or recommend a particular vendor's ATM NIC, or accept our selection of a NIC for testing with its ATM switching equipment.
- Digital Equipment Corp. declined without elaboration.
- IBM Corp. never sent us a written demurral.
- Madge Networks, Inc. said new products were under development and wouldn't be available for this review.
- Newbridge Networks Corp. cited a lack of resources and conflicts in the timing of our review.

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Performance testing

For the FORE and Xylan switches, performance was impressive (see graphic, page 82). At the high end, using the T/TCP software testing tool, we could move data at 144M bit/sec between two ATM-attached, Pentium 200 workstations, running Windows NT Server and Workstation, pushing data in one direction over the connectionless User Datagram Protocol (UDP)/IP protocol stack.

Note that T/TCP moves data memory-to-memory between networked systems; disk I/O, which is a part of most real-world client/server exchanges, would slow this down considerably. These NT systems can move data to and from high-speed networks such as ATM-155 and 100Base-T faster than their disk I/O can keep up, so any test involving disk reads or writes would have been measuring the disk I/O speed, not network performance.

The 144M bit/sec data exchange between servers was the maximum "raw" bit rate we observed passing over the optical fiber medium. The actual user data that passed between the stations in this scenario was about 108M bit/sec. The difference, more than 30M bit/sec, is attributed to the overhead of ATM and the UDP and IP protocols.

Throughput for regular TCP/IP traffic was less than two-thirds that of UDP/IP traffic because TCP/IP involves more overhead than UDP/IP, as well as intermittent acknowledgments that are sent back from receiver to sender.

In addition to ATM, Xylan's Omni-9x OmniSwitch can support any mix of 10/100 Ethernet, token ring and FDDI.

By comparison, the maximum network-traffic throughput we observed with the same systems connected over 100Base-T was about 90M bit/sec, with actual data-exchange rates 82M bit/sec over UDP/IP. Actual data-exchange rates while using the TCP/IP protocol stack narrowed the difference between networks — 69M bit/sec over ATM, compared with 66M bit/sec over 100Base-T.

100Base-T backbone switches can become bogged down under a heavy load. This was not the case with FORE's ATM switches. When we applied heavy background loads onto the FORE switch, the transfer rates between the two ATM-attached NT systems didn't slow down at all. However, we did notice a small reduction in maximum throughput when we applied heavy background loads onto the Xylan ATM switch. With roughly 500M bit/sec of background load, the best transfer rates between the two ATM-attached NT systems dropped slightly, from 55.8M bit/sec to 53.8M bit/sec (using TCP/IP).

During many of the performance tests we also ran a real-time, full-motion, bidirectional video channel between a different set of NT Servers — one on the 100Base-T network and the other on the ATM network. We checked to see if any factors, such as background load, would degrade the video picture, which was sent using a 3M bit/sec TCP/IP data stream in each direction. We noticed no degradation of the video signal passing between the systems on the 100Base-T and ATM networks, no matter how much background load we applied.

The only interruption we noted was when we intentionally broke one of the 100Base-T-to-ATM uplinks. It took the FORE equipment about 5 seconds to switch over the traffic load to the redundant link, while the Xylan configuration took about 12 seconds. Xylan's switchover is based on the Spanning Tree Protocol, which we set to detect this break and bring up the redundant link as fast as possible.

During the switchover time, the video channel dropped; the connection then had to be manually re-established. Note, too, that this broken link and switchover also dropped File Transfer Protocol (FTP) sessions that were under way. These were not automatically recovered after traffic was switched over to the redundant link; a new FTP session had to be established, which then worked fine.

Bottom line

A key question we sought to answer in testing was: Can client workstations on a 10/100Base-T network get better performance out of a server that's connected to an ATM backbone switch, rather than on a full-duplex 100Base-T port on the same switched network?

We found they can. Everything else being equal, you can usually count on getting more data faster out of a server via a full-duplex 155M bit/sec ATM NIC than via a full-duplex 100Base-T connection. In the real world, the performance difference will depend on a number of factors, including the protocol used, the server configuration (processor speed, disk I/O speed, amount of memory and so on), and the amount of load on the 10/100Base-T switched network.

ATM is complicated; mixing existing, legacy-LAN technologies with ATM elevates complexity to a new plateau. To pass a single packet of data from a server on an ATM switch to a client workstation on a Fast Ethernet network involves a mind-numbing barrage of unfamiliar services and protocol acronyms —BUS, LEC, SVCs, UBR, LECS and LES, to name just a few.

It doesn't take much exposure before network managers begin to learn the buzzwords and nuances of a new technology such as ATM. However, if a component goes bad and stops network traffic and nothing shows up as wrong on any of the management applications or interfaces, and if even on-site technicians who are well-versed with ATM don't know where to begin to look to fix it — well, that's pretty scary.

To survive in the looming shadow of Gigabit Ethernet, ATM will have to become easier to deploy and manage than it is today.

Mier is president of Mier Communications, Inc., a network consultancy and product test center based in Princeton Junction, N.J. Mier also publishes "Taking ATM to Task," a comprehensive annual report on ATM products, trends and issues. Smithers is manager of lab testing, and Scavo is a systems integration specialist at Mier Communications. They can be reached by phone at (609) 275-7311 or at ed, rob or tom@mier.com.

How we did it

While many organizations are installing ATM, most are only installing it in the backbone for now – not to the desktop. This means existing, shared-medium legacy LANs need to connect to, and over, the ATM backbone. We invited vendors to send in one of their ATM backbone switches, plus whatever other edge devices they offer for connecting 10/100Base-T (Ethernet and Fast Ethernet) LANs to the ATM backbone.

We also wanted to compare throughput for client-server data exchange for servers connected on 100Base-T switched networks, using servers connected directly to an ATM backbone switch. So we also needed a couple of ATM network interface cards (NIC) for the PCI buses in our Pentium-based 200-MHz Windows NT Servers.

We let the switch vendors decide which ATM NIC we would test with their ATM switches. FORE came in with its own brand of PCI bus-based NICs. Xylan doesn't make ATM NICs, so it provided a couple of Interphase Corp. ATM NICs, which Xylan resells.

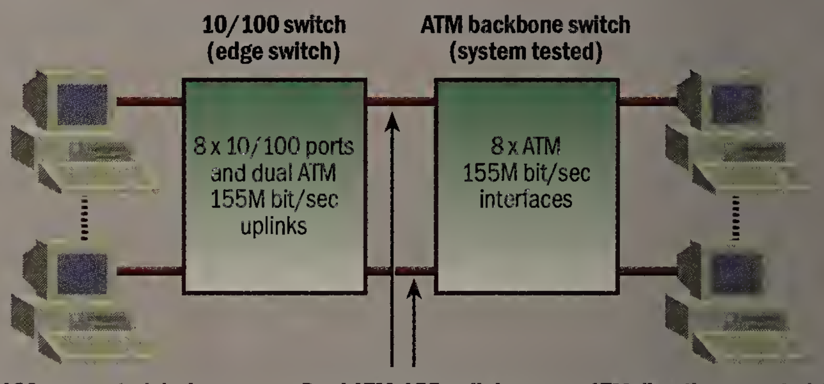
We also threw in a special requirement with the test configuration: The connectivity between the 10/100Base-T environment and the ATM backbone had to be over dual redundant ATM uplinks, so if one link failed, the other would automatically take over.

Measuring performance and throughput in such a mixed technology posed its own unique set of problems. We employed test gear from Hewlett-Packard Co., Adtech, Inc. and Net2Net Corp. for the ATM side, and from Shomiti Systems, Inc. and HP for the 10/100Base-T side. Also, for applying real-time traffic across both network environments we used a prototype TCP/IP-based video coder/decoder system from Litton-FiberCom.

For complete testing details, turn to an expanded "How We Did It" on Network World Fusion.

ATM switch testing environment

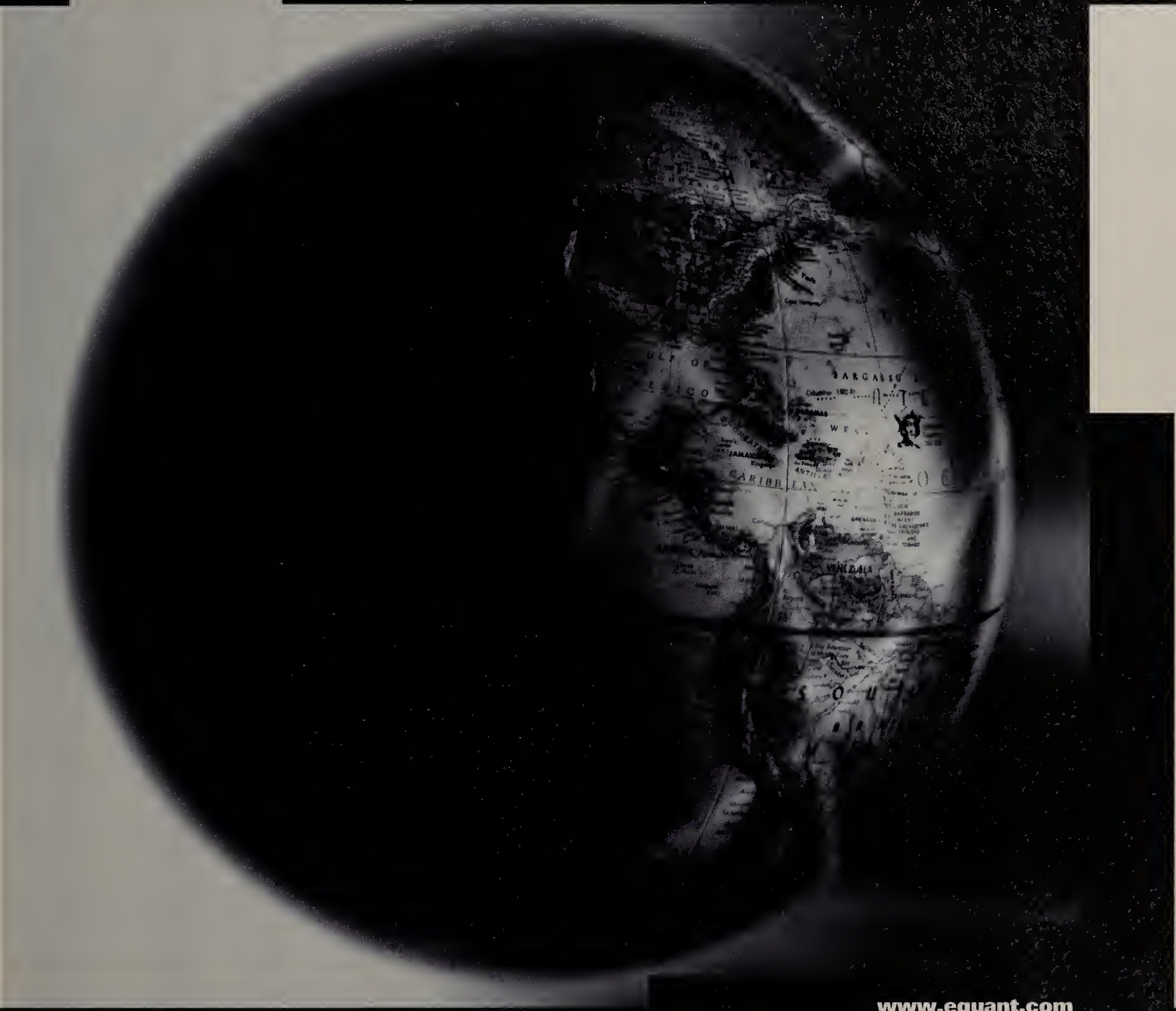
Mixing 10/100 Base-T and ATM switching technologies


10/100 switch (edge switch)
ATM backbone switch (system tested)
8 x 10/100 ports and dual ATM 155M bit/sec uplinks
8 x ATM 155M bit/sec interfaces

10/100-connected devices:
Windows 95 clients (Pentium/100)
MPEG-2 Video Server (NT)
Shomiti 10/100 test equipment
HP 10/100 test equipment

Dual ATM-155 uplinks:
Supporting failover backup redundancy

ATM directly connected devices:
NT Server (Pentium/200)
NT Workstation (Pentium/200)
MPEG-2 Video Server (NT)
Adtech ATM test equipment
HP ATM test equipment



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ATM, continued from page 78
to 310M bit/sec of switching capacity because the switching fabric must be ready to handle a full load in either direction. Consequently, the switching capacity needed to support eight fully loaded 155M bit/sec ATM links is nearly 2.5G bit/sec. You may want to consider 2.5G bit/sec as the minimum capacity for a backbone switch. Backbone switches commonly need to support heavily loaded bidirectional links on a continuous basis because they tend to connect other switches instead of individual end points.

Make sure you thoroughly understand what expandability options are offered. Expect to pay considerably more for a switch that can grow to, say, 10G bit/sec, even if you initially need only 2.5G bit/sec of switching capacity. Also know how the switching fabric expansion is handled architecturally. Find out if latency — the transit delay of cells traversing the switch — increases appreciably when the switching capacity expands. You don't want end-to-end delay to vary more than 5% or cumulative delay to exceed 50 to 75 msec.

Features and capabilities

Most ATM switches support many of the same features. All switches,

PRODUCT CHART: LAN-BASED ATM BACKBONE SWITCHES

Company	Product	Slots	Maximum number of ATM LAN ports			Capacity			Features						Classes of service				ATM network management			ATM standards				Permanent virtual circuits		Switched virtual circuits			Cost	
		Maximum number in chassis	25M bit/sec	155M bit/sec	622M bit/sec	Aggregate switching capacity (in bit/sec)	Latency for 53-byte cells (in microseconds)	Total buffer capacity (in cells)	Multi-switch VLAN support	ELAN support via LANE/MPOA	Same VLAN and ELAN features	Redundant switching	Redundant CPU	Nonblocking architecture	ABR	CBR	UBR	VBR real time and VBR non-real time	AToM MIB	ILMI MIB	ATM RMON	LANE 1.0	LANE 2.0	MPOA	PNNI	Maximum number per switch	Maximum number per trunk	Maximum number per switch	Maximum number per trunk	Network failure or backup link set-up and tear-down rate (in seconds)	Per port/Number of 155M bit/sec ATM multimode fiber ports	Network management software included in base price
Alcatel Data Networks (888) 236-2500 www.adn.alcatel.com	1100 LSS Model 590 (1)	9	192	32	16	13.2G	NS	2,097,152	●	●	●	●	●	●	●	●	●	●	●	●		●			●	1,048,576	65,536	1,048,576	65,536	NS	$1,991/32	
Bay Networks, Inc. (800) 822-9638 www.baynetworks.com	Centillion 100	6		24		10G	10	98,304	●	●	●			●		●	●	●	●	●		●				1,024	1,024	3,072	1,024	.01	$1,998/24	●
Cabletron Systems, Inc. (603) 332-9400 www.cabletron.com	SmartCell ZX-250 Family	4		16	3	2.5G	10	16,000 – 32,000	●	●	●			●	●	●	●	●	●	●		●			●	8,000	4,000	8,000	4,000	<1	$1,060 – $1,435/16	
Cisco Systems, Inc. (800) 553-6387 www.cisco.com	LightStream 1010	5	96	32	8	5G	19	64,000	●	●	●				●	●	●	●	●	●	●	●	●	●	●	32,000	32,000	32,000	32,000	<1	$1,200/32	●
Digital Equipment Corp. (800) 859-1758 www.networks.digital.com	GIGAswitch/ ATM 2.5	5		16	4	3.2G	10	390,000		●	●			●	●	●	●		●	●		●				16,000	16,000	16,000	16,000	.04	$2,653/16	●
FORE Systems, Inc. (888) 404-0444 www.fore.com	ForeRunner ASX-1000	4	24	16	4	2.5G (2)	<10	1,000,000	●	●	●	●	●	●	●	●	●	●		●		●		●	●	64,000	11,000	64,000	11,000	2	$2,058/16	●
Madge Networks (800) 876-2343 www.madge.com	Collage 740 Version 1.2	5		16	5	2.5G	16	32,000		●	●	●		●	●	●	●	●	●	●	●	●	●			256	256	>40,000	8,000	2-10	$2,142/16	●
NEC America, Inc. Corporate Networks Group (800) 832-6632 www.nec.com	Netnex 8550	4		16	16	2.5G	23	256,000	●	●	●			●	●	●	●	●		●		●			●	12,000	4,000	12,000	4,000	.038	$1,248/16	
Newbridge Networks, Inc. (800) 368-4843 www.newbridge.com	CS3000	8		32	8	6.4G	15	128,000	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	16,000	1,023	16,000	1,023	100-200	$1,400/32	
Olicom, Inc. (800) 265-4266 www.olicom.com	CrossFire OC-9100	4		16	3	2.5G	3	32,300	●	●	●	●		●	●	●	●	●	●	●		●	●		●	200	200	8,192+	8,192+	3.3-6	$1,200/16	●
Switched Network Technologies (888) 768-4286 www.sntc.com	EntraSwitch 6000	12	72	24		5.8G	15	32,768	●	●	●	●		●	●	●	●	●	●	●		●			●	16,384	8,192	16,384	8,192	300+	$952/24	●
Thomson-CSF Enterprise Networks, Inc. (408) 452-0555 www.thomflex.fr	Thomflex 5100 ATM Multimedia Backbone Switch	9	96	16		2.8G	<10	>1,000,000	●	●	●	●	●	●	●	●	●	●	●	●		●				32,768	2,048	32,768	1,000	.00006	$2,800/16	
3Com Corp. (800) 638-3266 www.3com.com	CoreBuilder 7000 HD Switch	4		32	8	5G	6	30,000	●	●	●	●	●	●	●	●	●	●	●	●		●			●	40,000	4,096	128,000	4,000	20	$2,200/32	
Xylan Corp. (800) 999-9526 www.[illegible]	Omni-9Wx	9	192	32	16	13.2G	NS	2,097,152	●	●	●	●	●	●	●	●	●	●	●	●		●			●	1,048,576	65,536	1,048,576	65,536	NS	$1,991/32	

Products highlighted in color were tested. • Blue Ribbon winner.

Footnotes: (1) This is an OEM version of Xylan's Omni-9Wx. (2) Scalable to 10G NS= Not specified

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for example, support PVCs, a basic component of ATM operation. The majority of new ATM switches also support SVCs.

One metric you may want to ask vendors about is the switch's SVC call-processing capacity, usually measured in SVC call setups per second or per minute. ATM clearly is evolving to SVCs from PVCs, which are fairly inefficient because chunks of bandwidth are allocated on a more or less permanent basis. All communication over ATM LAN Emulation 1.0 (LANE), for example, is done via SVCs. LANE 1.0 is the current standard that defines how traffic from legacy LANs is handled over ATM backbones. It's now widely supported by switch vendors, but performance can vary considerably.

A lot happens under the covers in an ATM switch, and some of the underlying mechanisms are implemented very differently from vendor to vendor, if they're implemented at all. Consider, for example, traffic policing and buffering.

Traffic policing is a worthwhile feature that compares the amount of bandwidth that's been reserved for a circuit or path with the bandwidth actually used. If congestion forces a switch to drop some traffic and a path exceeds its amount of reserved bandwidth, the switch will designate that traffic as eligible to be discarded.

Buffering is another mechanism to stop traffic loss; virtually all switches perform it to some degree. As a rule, the more buffers the better, but you may not want to buy the switch that has the most buffers. If the buffers aren't properly designed, they can result in other problems like variable cell delay.

Buffering ties in with other capabilities that the switch supports internally for flow and congestion management. A few techniques have been widely accepted and deployed for ATM flow and congestion management, such as one called dual leaky buckets. Understanding all the subtleties in this area requires a fair amount of education. Instead, ask the vendors if they have an independent third-party assessment of the switch's buffer or congestion-management architecture.

Multivendor Interoperability

A prudent business deploying a sizable ATM network will procure all of its ATM switches from the same vendor. This is an unpopular but candid assessment of the state of ATM interoperability today.

Clearly, a manager who pays for an ATM backbone expects the switch to interoperate with other vendors' equipment using accepted ATM standards. And most ATM vendors are moving to ensure their equipment complies with the standards and works with other vendors' ATM wares.

But the industry can't yet claim full interoperability of ATM switches.

Roughly half of the ATM Forum's specified interfaces are solidified and mature enough to boast general interoperability between different vendors' implementations, while the other half still can present problems. Most designs keep new switch code in software, rather than committing it to firmware, so changes can be readily made.

To be sure, ATM products already can be considered interoperable with respect to a number of standards. These apply mainly to the end-user side of the network, such as UNI 3.0 and 3.1 and even LANE 1.0 client implementations as found in ATM network interface card drivers and edge switches.

The further inside an ATM network you go, the more likely it is that interoperability problems relating to the latest ATM standards will occur. For example, different vendors' switches may interoperate using an older, static-network protocol called Interim Interswitch Signaling Protocol, but may not work together using the newer, dynamic-network Private Network-to-Network Interface protocol.

You can buy ATM today and build a network that, in all likelihood, will outperform any other technology. But be prepared for ATM's high cost and complexity and the need to keep pace with frequent changes as the technology matures. ■

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Circle Reader Service #7

Diversity disconnect

Continued from page 1

The fact is, women and minorities are vastly underrepresented in network departments. The majority of respondents to a survey of 200 *Network World* readers said minorities make up less than 5% of their network staffs, yet figures from the U.S. Bureau of the Census indicate African-Americans account for 12% of the population and Hispanics 9%. Similarly, more than half of all respondents said women comprise less than 25% of their network IS staffs. Yet women account for 51% of the population and, according to the U.S. Bureau of Labor Statistics (BLS), 46% of the labor pool nationwide.

It may be tempting to chalk up the imbalance to discrimination. It also would be largely inaccurate. Racial and gender discrimination in network IT does exist, but the reasons for imbalanced staffs are far more complicated than just discrimination, and no single group shoulders all the blame.

SALARY DISCREPANCIES

Median annual salaries for 1982 computer and mathematics graduates

Bachelor's degree

Men	Women
$31,200	$30,000

Master's degree

Men	Women
$40,000	$37,400

Average salary gap for 1993 science/engineering doctorate recipients as compared to Caucasians

Blacks	$7,100
Hispanics	$5,800
Asians	$4,100
Native Americans	$6,500

SOURCE: NATIONAL SCIENCE FOUNDATION, ARLINGTON, VA

Contributing factors include age-old hiring practices; the exodus of many companies to suburbs where the job candidate pool is largely white; educational hurdles; limited access to technology; lack of role models; and even ostracism from peers for choosing a career path dominated by white males.

"For whatever reason, African-Americans are not showing up at the door," says George Williams, a consultant with Paternite & Associates, of Cleveland, and national president of the Black Data Processing Associates (BDPA), a 2,200-member national interest group for IS professionals of diverse ethnic backgrounds.

And those minorities who do manage to land positions within network departments are more likely than their Caucasian counterparts to stagnate in entry-level jobs or low-end managerial positions — often because they are not plugged into the informal network where they can learn about upcoming projects or build relationships with peers and important power players.

Whatever the reasons for the network staffing imbalance, it's clear there are sound reasons why you'd want to balance the racial and gender makeup of your network staff.

"You need diversity of thought," says Yvonne Sharpe, a 22-year Allstate Insurance Co. veteran who has risen through the ranks to systems director of Information Management Strategy and Architecture. "Women think differently, minorities think differently. Those differences can give you more information to solve problems."

A racially and gender-balanced network staff also can help fend off discrimination lawsuits or claims of unfair labor practices.

And there's a simpler reason. Given the intense competition for talented network professionals, you simply can't afford to ignore whole classes of candidates.

Numbers tell a story

But the *Network World* survey essentially shows that's exactly what's happening. One-third of the 200 respondents said they have never hired a woman in their network departments, while 37% have never hired a minority.

The survey, which targeted executives with hiring responsibility for a staff of at least 10 at companies with at least $10 million in annual revenue, shows there is a discrepancy between perception and reality in terms of minority representation in network IS departments.

Two out of every three respondents believe women and minorities are sufficiently represented on network staffs, while only 20% think they are underrepresented.

But two out of three respondents said on average African-Americans account for less than 5% of their network departments. The numbers are even worse for Hispanics — 78% of respondents said they comprise less than 5% of their network departments (see graphic, page 98).

Women fared somewhat better: Almost 44% of survey participants said women make up more than 25% of their net staffs, and 19.5% said they account for 10% to 24%. Just over 30% said women account for less than 5%.

When it comes to management positions, however, the numbers are dire. A whopping 93% of respondents said Hispanics account for less than 5% of management positions in network departments, while 86% said African-Americans comprise less than 5%.

With regard to women, 59% of the respondents said they make up less than 5% of the managerial ranks. *Network World's* annual salary survey, which targets management-level network IS professionals, backs up those figures. Of the more than 1,300 managers surveyed at random since 1995, nearly 89% have been male.

Data collected by the BLS shows the problem reaches well beyond network departments. The BLS says only 7.2% of all computer scientists are African-American and 2.6% are of Hispanic origin. The BLS does not track specific network positions.

The BLS statistics indicate that minorities fare better in low-level maintenance and entry-level computer science positions — 9.9% of all 1996 data processing equipment repairers were African-American and 7.9% were Hispanic.

Educational dilemma

Chris Williams is a network consultant at Perot Systems Corp. oversees a blockbuster network outsourcing deal in Basel, Switzerland, for Swiss Bank Corp. Williams still recalls the taunts hurled at him by African-American peers who chided his near-perfect English in high school. "I can't tell you how many girlfriends told me I talk like a white person," Williams says.

What's keeping minorities and women from seeking network IS careers? It starts with educational and social hurdles.

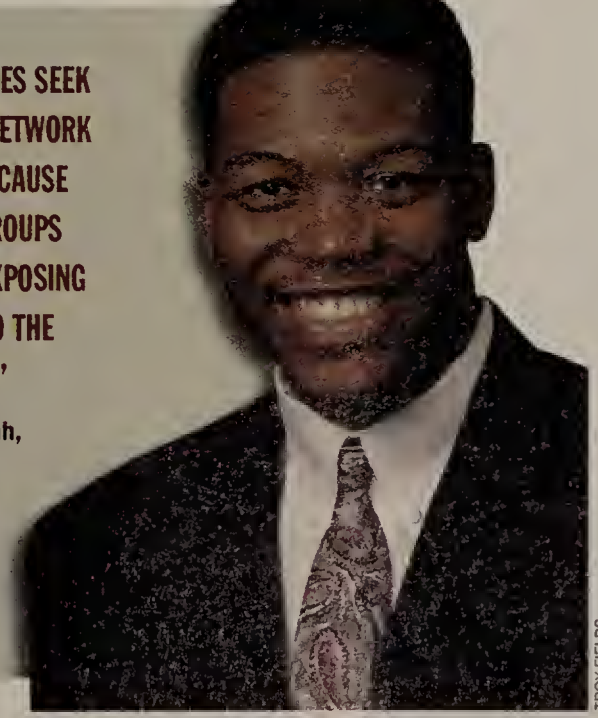
"A lot of it has to do with minority groups not exposing their kids to the technology," says Johnnie Hannah, director of IS at the United Way of Greater Toledo, Ohio.

Rudy Duke, a management consultant with The Hunter Group, Inc., a Baltimore-based firm

See **Diversity,** *page 96*

FEW MINORITIES SEEK CAREERS IN NETWORK IS IN PART BECAUSE "MINORITY GROUPS [ARE] NOT EXPOSING THEIR KIDS TO THE TECHNOLOGY."

Johnnie Hannah, director of IS at the United Way of Greater Toledo.



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Continued from page 93

that specializes in reengineering and information management services, agrees. There is a fear in the minority community of things related to math and science, he says, and "minority children are steered into other fields."

School systems aren't giving students enough access to computer and Internet technology, Hannah says. But there's a bigger issue, too — immersing minority students in basic and advanced math and science courses.

According to the National Science Foundation (NSF), black and Hispanic students in 1992 were still far less likely to have taken advanced math courses than whites. While about 60% of white and Asian students had taken Algebra II, less than half of all blacks, Hispanics and Native Americans had taken the course. And almost 13% of blacks, 15% of Hispanics and 10% of Native Americans had taken calculus vs. 22% for whites and 33% for Asians.

There are some signs of improvement, though. The percentages of black, Hispanic and Native American students taking many basic and advanced math courses doubled between 1982 and 1992. For example, 30% of black high school graduates in 1982 had taken geometry and 1% took calculus. A decade later, the percentages rose to 60% and 7%, respectively.

Another problem minorities face as they enter college is the dearth of minority mentors among the professional ranks. Less than 4% of all business school professors are minorities, says Bernie Milano, executive director of the KPMG Foundation, which oversees The PhD Project, an effort to diversify business school faculty.

Last year, 1,200 business doctorates were awarded nationwide, Milano says. But at no time have more than 50 business doctorates been awarded in one year to African-Americans, Hispanics or Native Americans. In 1995, the most recent year for which data is available, 26 African-Americans and 12 Hispanics received business-related doctorates.

"These people serve as mentors for college students," Milano says. "Without an ample supply of minority doctorates, students may not identify well with their counselors and lose interest in their education."

Minorities seem to be faring better when it comes to undergraduate degrees. In 1993, the most recent year for which statistics are available, a little more than 16,000 of all bachelor's degrees in computer science were awarded to Caucasian students vs. 2,213, about 11.5% of the total, to African-Americans, and 1,096, nearly 6%, to Hispanics. Given that African-Americans and Hispanics account for 12% and 9% of the population, respectively, those numbers, while not glowing, can be construed

STOPPING SHORT

Almost 69% of the respondents to *Network World's* diversity survey said their organizations have diversity policies that encourage the hiring of minorities and women. Yet only 14% said they have programs to help minorities further their careers, while 25% said programs exist to help women.

Student strives to beat the odds

Courtney Hall has a dream.

The 16-year-old junior at National Christian Academy in Oxen Hill, Md., hopes to someday marry her love for expert systems with her infatuation for Web page design, parlaying them into a career in computer science and networking.

But Hall isn't like other technokids. She's taken honorable mention in a national science fair sponsored by the National Technical Association. And she's published an Internet tutorial paper at the District of Columbia Computer Science Conference.

Despite these accomplishments, Hall is preparing for a rough road ahead.

"I've got two points against me — being black and a woman," she says. "But I'm going to make my career in IT whether it's a white male-dominated world or not. Nothing's going to stop me."

Hall exudes determination. But that may carry her only so far in her quest to establish a career in network and IT departments. As a result, the teenager sometimes sacrifices weekends and puts in extra time to develop mentors that will prepare her for college and life in the corporate world.

"There will be discrimination in the workplace, but you have to learn how to deal with it," Hall says. "What I need are mentors and a support network to guide me."

Like many African-American students, Hall's enthusiasm for IT is the result of outreach programs put in place by groups, such as the Black Data Processing Associates, to encourage kids to enter IT fields.

A large measure of Hall's success is attributable to her weekend studies with the Joint Educational Facilities, Inc. (JEF). JEF is a Washington, D.C., organization that teaches advanced computer topics to junior high and high school students with the aim of preparing them for local, national and international symposiums and competitions, according to Jesse Bemley, JEF's cofounder and one of Hall's mentors.

Development of Hall's oral and written communications skills and her commitment to learning about the Internet, Web page development and the Java programming language will arm her with the skills she needs to succeed in IT, Bemley says.

"Quite often, what minority students are getting in school are basic word processing, spreadsheet and some database exposure — if they're getting any computer exposure at all," Bemley says. "The only way to urge these students into IT is to excite them about some of the advanced topics and then encourage them to learn more."

Bemley says he feels some degree of satisfaction because later this year two former JEF students will enter Ph.D. programs, the first students to reach that plateau since JEF reached out to students in 1991.

That same program is giving Hall the opportunity to interact with industry players and possibly court an internship that may lead to permanent employment.

Hall, however, emphasizes that she doesn't seek employers that give preferential treatment. "I just want to be treated like anyone else," she says. "I want to be judged on my contributions and whether I'm an asset to the company."

COURTNEY HALL SAYS SHE HAS TWO STRIKES AGAINST HER: "BEING BLACK AND A WOMAN." BUT SHE SAYS, "YOU HAVE TO LEARN HOW TO DEAL WITH [DISCRIMINATION]."

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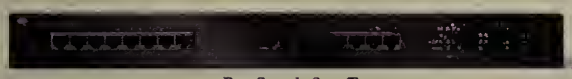

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Circle Reader Service #4

as pouring to progress.

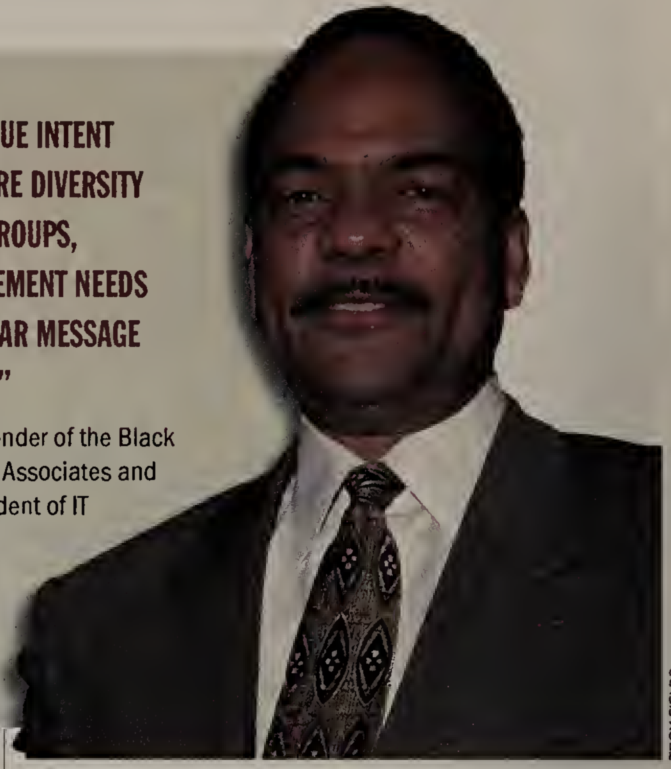
Women, meanwhile, are fighting a similar numbers game. Women account for only 22% of the science and engineering workforce, according to the NSF. More important, NSF research shows the percentage of women earning bachelor's degrees in computer science decreased from 36% in 1983 to 28% in 1993. And less than 30% of all master's degrees in computer science were awarded to women in 1993.

That's one reason Cathy Marvel, assistant vice president in the IT department of Chubb & Son Company, Inc., is talking to her local high school. As part of Chubb's IT Womens Council, Marvel believes females in IT need to inspire other women to follow their lead.

"Our goal is to show them that women and minorities have a place in this industry," Marvel says. "The process has to start early, so those who choose an IT career make the right educational choices."

But the Federal Glass Ceiling Commission, a task force of the U.S. Department of Labor, reported in 1995 "the climate in industry may be less favorable to women for a number of reasons, including recruitment and hiring practices, a corporate culture hostile to women, lack of opportunities for career development, failure to accommodate work-family issues, lack of mentoring and lack of access to informal networks of communication."

"IF THERE'S TRUE INTENT TO CREATE MORE DIVERSITY IN NETWORK GROUPS, UPPER MANAGEMENT NEEDS TO SEND A CLEAR MESSAGE TO MANAGERS."



Earl Pace, cofounder of the Black Data Processing Associates and senior vice president of IT at Third Federal Savings Bank in Newtown, Pa.

TROY FIELDS

Getting hired

Otis Stone is vice president of Data Systems at Hudson Industries, Inc. of Troy, Ala. He says his company advertises network IS jobs in local papers, but doesn't pull any response from minorities. "The Africans [sic] don't want to apply," says Stone, who says minority candidates don't live in his community.

Doug Brown, network manager at Lockheed-Martin-Vought in Dallas, says he hires based on candidates' qualifications, not their skin color. "Our concern is: Can the person do the job?" he says. "It would be nice to have a wider, more diverse employee group." Brown regrets that the company doesn't make time to actively seek out minority candidates.

A major contributing factor to the unbalanced racial and gender makeup of network IS staffs is the fact that many companies do not make diversity a hiring priority.

While affirmative action programs are coming under fire at all levels of government, in the network IT sector the programs have already degenerated into mere window dressing, according to Earl Pace, cofounder of the BDPA and senior vice president of IT at Third Federal Savings Bank in Newtown, Pa.

Pace says some organizations send representatives to the BDPA's annual conference to indoctrinate members about their employers. However, he says the messengers often turn out to be powerless community relations personnel who "handle the PR fluff well, but can't offer any action of substance." Moreover, between 100 and 125 students compete in computer competitions at the BDPA conference and try to hook up with major companies for internships. Of those, "maybe 30 students get that kind of access," Pace says.

"If there's true intent to create more diversity in network groups, upper management needs to send a clear message to managers below that they're committed," he says.

Network managers interviewed for this story say they are anxious to hire people with the required skills, but harried schedules leave them no time to take the extra steps required to find minority candidates.

"The reason they have trouble is they're looking for a network analyst or LAN administrator, but they have no means to identify which of them are minorities," says Tracey Minor, president of The Multicultural Advantage, a Philadelphia recruitment firm specializing in placement of minorities in IS.

"If a company invests the time to go to the [minority] schools, they will find candidates," says BDPA's Williams.

Companies often overlook traditional black schools such as Howard University, Hampton College, Morehouse College and others in favor of their largely white alma maters or schools recommended by senior managers.

"If you don't go to the schools where you can find minorities, you're not going to get them," says Allstate's Sharpe.

Many companies also have moved out of cities and into the suburbs, consequently recruiting from largely Caucasian schools. The exodus of corporate data centers from the inner cities to the outer suburbs also makes it difficult for some minorities to commute to jobs, Sharpe says.

The discrimination factor

Earl Pace recalls an incident in 1974 when he worked for a railroad company. Pace had been promoted to programming manager of a group of 15 Caucasian mainframe applications developers. He subsequently hired three African-Americans.

During a break in a managerial staff meeting, a board member approached Pace and asked him, "Is your plan to turn the entire programming staff into African-Americans?"

Discrimination still exists in network IS, although often on a subtle scale. Maybe it happens when a black man walks in the office door and senses a mood change, Pace says, or when a woman realizes she's being treated differently from other peers.

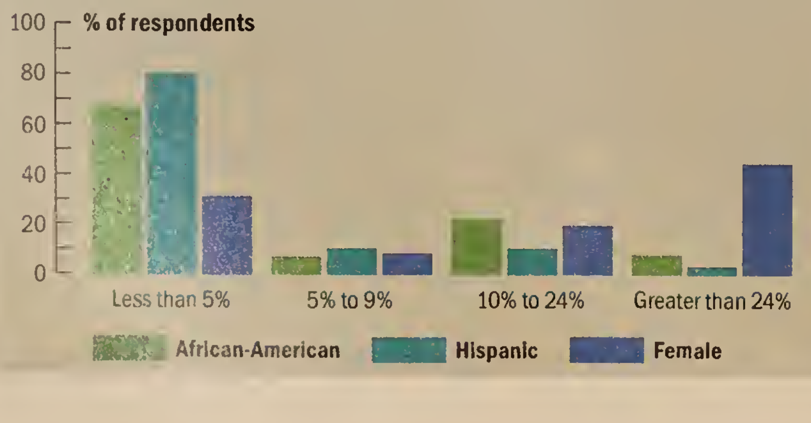
Minorities interviewed for this story talk about greater transgressions: promised pay raises that never materialize, lower pay scales for some minorities, promotions being held back and organizations that raise their technical standards

NETWORK WORLD SURVEY

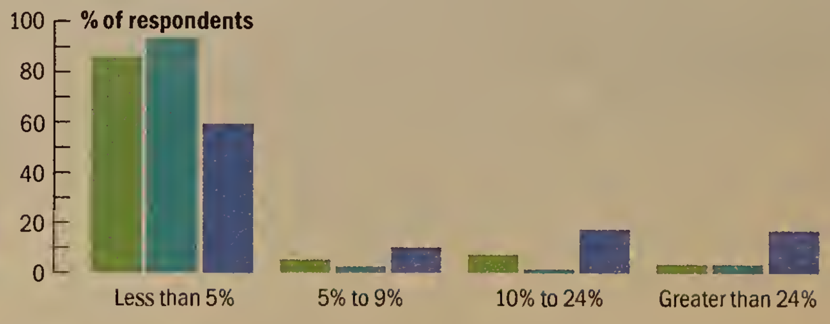
ILLUSTRATING THE DIVERSITY PROBLEM

Few industry statistics exist that paint a picture of race and gender representation within network IS staffs. So *Network World* commissioned First Market Research Corp., of Austin, Texas, to conduct a telephone survey of 200 *Network World* readers, targeting managers with hiring responsibility for a staff of at least 10 people. The results offer ample evidence that minorities and women are grossly underrepresented in network departments.

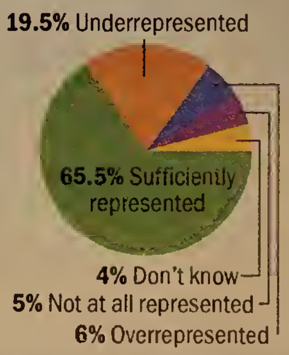
1. What percentage of your network department is African-American, Hispanic or female?



2. What percentage of your network department's management is represented by African-Americans, Hispanics or females?



3. In your IT organization, are females and minorities. . .



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for minorities.

"I'm not a poster boy for discrimination, but I've been discriminated against," says the Hunter Group's Duke.

Duke says he was passed over for partner while at Computer Sciences Corp. (CSC), a Washington, D.C.-area network integration services firm. That happened even after he had earned his MBA, so "that excuse couldn't crop up any longer."

Hayward Fisk, CSC vice president and general counsel, says the company has "a diverse work force and takes pride in [its] affirmative action programs," but he declined to comment on Duke's case, citing a confidential separation agreement signed when Duke left the company in February.

There is much more information online about diversity in network IS. Here's a sampling of resources we've linked to:

- **The Women In Technology International Web site, which offers an online forum, articles and tips about women in the technical workplace as well as hotlinks to the National Women's Business Council.**
- **The Web site of the Black Data Processing Associates, a 2,200-member nonprofit organization of IT professionals, entrepreneurs, educators and students.**
- **A 1996 National Science Foundation report that explores the educational, social and financial reasons why women, minorities and disabled persons are underrepresented in science and engineering professions.**

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There seems to be ample evidence that women, African-Americans, Hispanics and other minorities are discriminated against financially.

A September 1996 NSF report found the average salary in 1993 for women with doctorates in science and engineering was $50,200 compared with $63,600 for their male counterparts. That's a difference of $13,400, or 27%, the largest disparity between any two groups. Women with a master's degree in computer science or mathematics earned $37,400 on average compared with $40,000 for men with the same degree. Men held a $1,200 edge over women with comparable bachelor's degrees.

SALARY SURVEY HIGHLIGHTS GENDER-BASED DISCREPANCY

Network World's 1997 Salary Survey shows that, on average, male network managers this year made almost $10,000 more than their female counterparts. And while better than 25% of males made more than $90,000, only 9% of females made that claim.

		Total	Male	Female
Salary range	No. of respondents	**352**	**309**	**43**
$20,000 - $29,999		0.9%	1.0%	0
$30,000 - $39,999		2.0%	2.3%	0
$40,000 - $49,999		8.8%	8.4%	11.6%
$50,000 - $59,999		12.8%	11.0%	25.6%
$60,000 - $69,999		14.2%	13.9%	16.3%
$70,000 - $79,999		20.7%	21.4%	16.3%
$80,000 - $89,999		14.2%	13.3%	20.9%
$90,000 - $99,999		9.9%	10.4%	4.7%
$100,000 or more		16.5%	17.8%	4.7%
		Average salary	**$78,759**	**$68,877**

SOURCE: 1997 Network World/Deloitte & Touche Consulting Group Salary Survey

Network World's 1997 Salary Survey likewise illustrates the disparity. Male respondents reported an average 1997 salary of $78,759, while their female counterparts averaged only $68,877, a difference of $9,882, or 14%. The numbers also show that precious few females are cracking the top salary ranks, with less than 10% earning $90,000 or above, while more than 25% of male respondents make that much (see graphic below).

The salary differences for minorities who hold doctorate degrees is not as pronounced as the gender salary gap. However, the differences between white males and minority graduates with bachelor's degrees in science and engineering ranges from $4,100 for Asians to $7,100 for blacks.

Money problems aside, women in network IS have their own unique barriers to ascending the management ladder. Male managers are sometimes threatened by female staffers who push hard for their ideas and proposals, says Renee McClure, a systems designer at Long Island Lighting Co. "I've been told by many white males that I'm intimidating," says McClure. "As a black woman, I not only have to fight the racial problem, but I have to change a mind-set about the role of women."

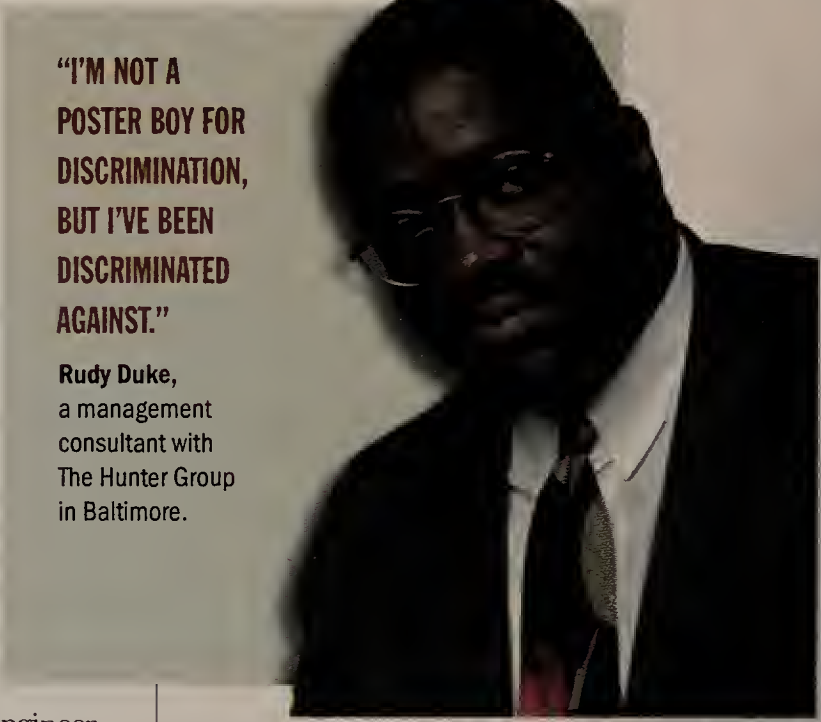
Climbing the ladder

Early in his career at Electronic Data Systems Corp., account executive Curvie Burton passed up an opportunity at a social gathering to speak with the company's chief information officer, a white male in his mid-50s. "I didn't feel I had anything in common to talk about with him at the time," says Burton, who is African-American. "Afterwards, I thought about all the things I could have said, and I knew I blew it. You have to be ready."

One of the key reasons minorities and women languish in nonmanagerial network IS jobs is they are unable to break into the informal network where employees learn about high-profile projects and build relationships with company power brokers. Minorities hurt their career chances because "they often don't understand the unwritten rules," Allstate's Sharpe says.

Make no mistake, white males face the same challenge but often find it easier to network with friends and gain access to senior executives because they have more in common.

"The IT industry is still an all-boys club," says Anne York, a computer consultant with Computer Management Science, Inc. in Jacksonville, Fla. "If you don't play golf, participate in social events or even gossip at the coffee machine, it hinders your career. You're usually the last to know of information coming down the pike."



"I'M NOT A POSTER BOY FOR DISCRIMINATION, BUT I'VE BEEN DISCRIMINATED AGAINST."

Rudy Duke, a management consultant with The Hunter Group in Baltimore.

TROY FIELDS

Few companies have formal programs to help women and minorities climb the management ladder. While nearly 70% of the respondents to *Network World's* reader survey said their companies had a policy that encourages the hiring of women and minorities, 80% admitted their companies offer no mentoring, leadership training or other programs tailored to help women and minorities nurture their careers.

Another reason why minorities are scarce in the network management ranks is that many give up trying to break the glass ceiling at private companies and move on to the consulting end of the business.

BDPA's Pace and Williams both landed in consultant roles after struggling to break barriers in IS shops — as did Rudy Duke and Jesse Rodgers.

"There's a feeling in consulting that you're a hired gun; you do your work, satisfy the client and get paid," Duke says.

Moreover, performance is tied to billable accounts and the amount of money a consultant accumulates, not skin color or gender.

Even in consulting, though, minorities encounter racial discrimination. Rodgers recalls, on one recent project, a client bought into his network design ideas via phone conversations, but during a subsequent face-to-face meeting, the client began questioning Rodgers' qualifications.

"That should happen up front, not during the sign-off stage of a project design," he says, adding that the client eventually handed the project to another consulting firm. "Consulting isn't a haven from discrimination."

Clearly, network IS management faces a diversity dilemma, one that leaves companies short when it comes to bringing the broadest range of thought into their organizations and at a disadvantage in terms of finding the best technical talent.

But there are ways to correct the problem. Next week, we'll fill you in on the innovative programs that companies such as Allstate, Chubb & Son and Federal Express Co. have come up with to reach out to minorities and women. We'll also relay tips from those who have successfully scaled the management ranks. ■

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Atlanta's IS job climate is as hot as its summers

The city's heat wave is forecast to last for several years, thanks to low unemployment and a healthy job growth rate.

By George V. Hulme

NetWorld+Interop 97 show-goers who scan the help wanted listings in Atlanta newspapers may not be in any hurry to catch their return flights this week.

Home to established companies such as Cable News Network, Inc., Coca-Cola Co., Delta Air Lines, Inc. and The Home Depot, Inc., Atlanta is one of the fastest growing regions in the country. For network IS pros, it's a veritable gold rush.

"Name the job description — programmer, engineer, tech writer, help desk, database administrator — as long as you are working with information systems, there are plenty of opportunities here," says Bill Gower, a founding partner of Matrix Resources, Inc., an Atlanta recruitment firm.

"The only reason to be unemployed in the high-tech field in Atlanta is that you are not interested in working," says John Himebook, technical recruiting manager for MA&A Group, Inc., another recruitment firm in Atlanta. Himebook says the people he is working with who want to relocate to Atlanta each have at least four opportunities to apply for.

Beach Clark, manager of network architecture for The Home Depot, agrees that Atlanta's job market is tilted in employees' favor. When he arrived in the city six years ago, employers took their time considering applicants and spent six to eight weeks interviewing prospects. In the current market, you'll lose good candidates if you wait even a week, so the hiring process has been reduced to a matter of days.

THE HOME DEPOT
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Network professionals *Beach Clark and Dan Haumann of The Home Depot agree that Atlanta's IS job market is attractive.*

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SOURCE: MA&A GROUP, ATLANTA

Georgia, sweet Georgia

The intense competition for workers is a result of the area's low unemployment and healthy growth rates. DRI/McGraw-Hill, an economic research and forecasting consultancy in Lexington, Mass., ranked Atlanta the No. 1 city for job creation in its 1995 study. The metropolitan area has a population of 2.6 million and is expected to gain 267,600 new jobs by the year 2000.

The city also has been prominently ranked on several other business-oriented lists in the past few years. It has earned designations such as "healthiest city" and "hottest metro market in the Southeast."

Some of these accolades may reflect why *Network World's* sister publication, *Computerworld,* ranked Home Depot eleventh or better in each of its past three reports on the "100 Best Places to Work in IS."

"This is a very employee-friendly town. I would not go anywhere else," Home Depot's Clark says. The company's relaxed dress code, discouragement of weekend work and proactive approach toward charities such as Habitat for Humanity are a few of the reasons he chose to work for the retail home supply giant.

When Scott Larish first considered relocating to Atlanta from Los Angeles, his wife wanted nothing to do with the move. "I finally convinced her to come out and look at some houses," says the senior technical consultant at MA&A Group. "After three days, she couldn't wait to move here." Six years later, the Larishes have found an excellent balance of career and family life in Atlanta. "When you add everything up — the Southern hospitality, the relative low cost of housing and an outstanding school system, I can't think of a better place," he says.

How Atlanta's housing stacks up

Median price for a 2,200 square-foot home

Atlanta	$171,475
Austin, Texas	$173,250
Charlotte, N.C.	$160,375
Chicago	$450,000
Cincinnati	$188,313
Dallas	$143,500
Denver	$178,037
Los Angeles/ Long Beach	$317,500
New York	$395,375
Orlando, Fla.	$147,500
San Francisco	$583,325
Seattle	$228,000
Washington, D.C.	$268,500

SOURCE: COLDWELL BANKER, Q1 1997

Dan Haumann, manager of network services at Home Depot, made an early career move to Atlanta. "Atlanta is a young city, so there are a lot of companies that are risk takers, and they are willing to invest in young talent. That is what attracted me initially," he says.

Although Home Depot will look beyond the community to fill open jobs, the company rarely has to do so, says T. Reed Gary, the firm's technical recruiter. "The colleges in this area produce most of the technical people needed, though for an exact skill set we'll look outside the area," he says.

The region boasts an abundance of sites for continuing education. Its roughly 40 major schools and colleges include Dekalb Technical Institute, Emory University, Georgia Institute of Technology and Georgia State University.

Still, career and schooling aren't the region's only attractions: The city has everything a major metropolitan area would offer —sports, nightlife, parks and cultural events. "If you like anything outside, Atlanta probably has even more to offer because of the warm climate," adds Himebook.

Indeed, average monthly temperatures in Atlanta remain fairly steady — 64.8 degrees in spring, 79.6 in summer, 65.4 in fall and 47.0 in winter. It only snows about once every five years, with an average of 4 inches per storm.

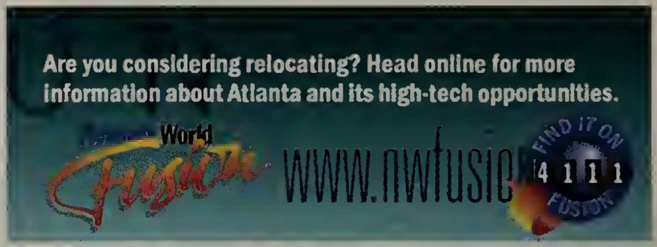
But the city isn't without a few drawbacks. New Yorkers and Los Angelenos will feel right at home sitting in Atlanta's traffic. "The traffic can get pretty jammed," says Larish, who adds that he misses the easy access to ski resorts in the Northeast, but can live with only skiing once or twice a year.

If you're considering moving to Atlanta, you have plenty of company. The mild temperatures and favorable business environment entice more than 70,000 newcomers and 200 business relocations every year.

Just 10 years ago hardly anyone spoke about Atlanta as a viable choice to relocate, but all that has changed with the success of CNN and high-profile events such as the '96 Summer Olympic Games.

"It's only been in the 1990s that the word has gotten out; Atlanta is no longer a wannabe city — it has arrived," Gary says.

Hulme is a freelance writer in Croydon, Pa. He can be contacted at geohulme@reporters.net.



Are you considering relocating? Head online for more information about Atlanta and its high-tech opportunities.

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The following openings require a BSCS/EE or equivalent, and 2-5+ years' related experience unless otherwise indicated.

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ASIC Project Leader

Be the lead engineer on a new network controller ASIC. Requires 5+ years' experience in hardware development and strong skills in architecture, design, synthesis, simulation and physical testing of ASICs. Knowledge of PCI bus and Network Interface Card hardware also required. Must be an expert ASIC designer with strong skills using VHDL and synthesis tools.

Hardware Engineers/Adapters

Develop new adapter cards for 100 Mbps and 1000 Mbps Ethernet, from architecture through production and design, layout and test new circuit boards. Requires experience in hardware development, PC systems architecture, PCI bus design, high-speed analog signal integrity and design for manufacturability. A background in networking and ASIC/FPGA design also required.

ASIC Design Engineers/Adapters

Develop new ASICs for high 100 Mbps and 1000 Mbps Ethernet adapter cards. Define, design, synthesis, simulation and test large ASIC designs. Requires experience in hardware development and experience with VHDL/Verilog design and synthesis, functional simulation, timing analysis and test vector generation. Knowledge of PCI bus, networking and mixed signal design a must.

ASIC Design Engineer

Join a team responsible for developing ASIC components for custom Fast Ethernet print servers and peripheral platforms. Must have experience with digital hardware/ASIC design, and knowledge of ASIC VLSI technology.

Program Manager

Lead a cross-functional design team in bringing new system-level networking products to the LAN market. Requires experience in leading complex hardware/software engineering development teams (project or technical management).

Senior Hardware Engineers/Fast Ethernet

Lead the design of next-generation Fast Ethernet hub and switch products. Requires 8+ years' experience in complex hardware design, and experience with high-speed board and FPGA/ASIC design. Experience with LANs or other data communications equipment required.

Component Manufacturing Manager

Coordinate multiple worldwide sites in the design and manufacture of Intel Networking components. Requires 10+ years' experience in the electronics industry and 3+ years' experience in component manufacturing, IC program or project management. Experience with high-volume ramps, transferring component products between multiple sites and the introduction of process or methodology changes required.

Component Development Program Manager

Manage multiple networking component development programs. You'll assemble a development team; capture customer requirements; develop schedules, budgets and commitments; set up the manufacturing capacity; and ensure that the program is executed properly. Requires 5-10+ years' related experience with 3+ years' experience in IC program or project management. Must also have demonstrated success in program management of IC products, as well as component-level product experience through full development and product release cycle.

Senior Component Product/Test Engineer

Generate test programs and perform debug, validation, characterization and manufacturing introduction of Intel's Networking components. Work with Design Engineering to introduce new products into production and solve test/manufacturing problems throughout the life of the device. Requires experience writing and debugging component-level test programs on a mixed-signal ATE tester and experience writing characterization/validation software.

Software

Senior Software Engineers

As a senior member of the development team, deliver new network adapter products to the market. Requires 8+ years' software development experience, solid networking knowledge, and architecture development in a network environment experience.

Software QA Engineers

Manage the planning and testing of device drivers and software for Intel's network adapters. Requires experience performing formal testing and/or evaluation on PC software. Experience with Novell NetWare and Windows NT a plus.

Software Engineers

Project lead in developing an automated installation wizard for a new family of Home Networking products running under Win95 and/or NT. Requires experience with Win95/NT (Win 32) application programming and installation processes, MFC/GUI and registry/registry APIs.

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Software Design Engineers/Networking

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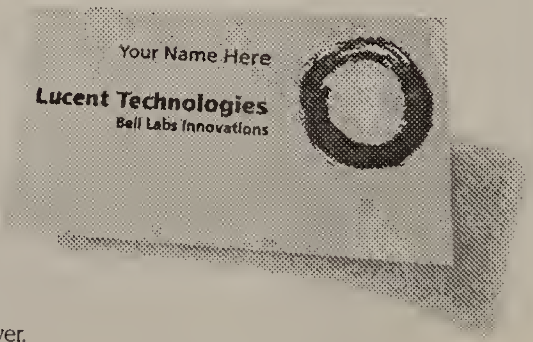

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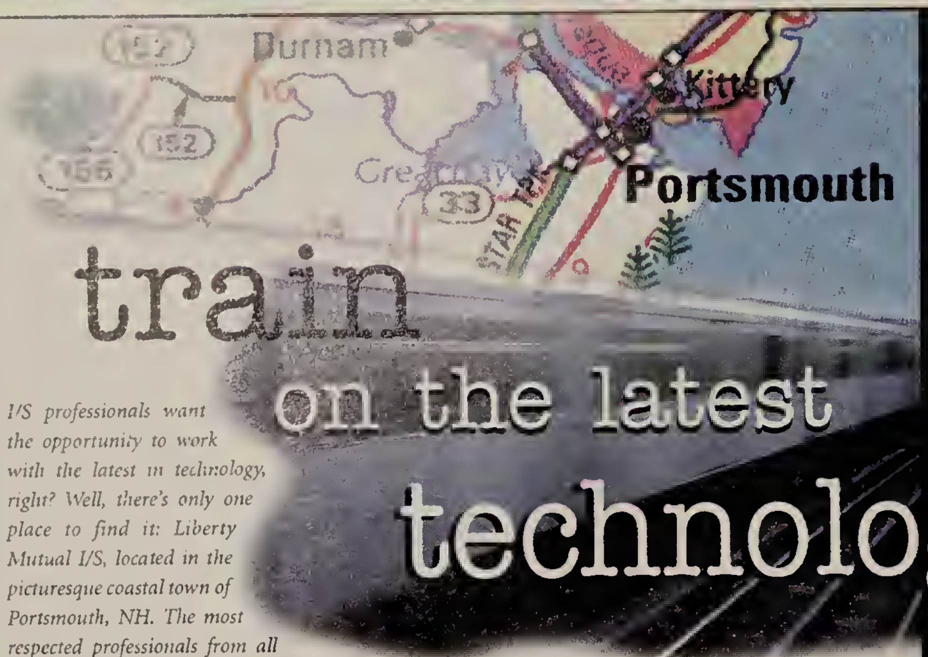

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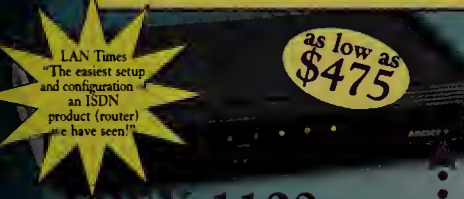
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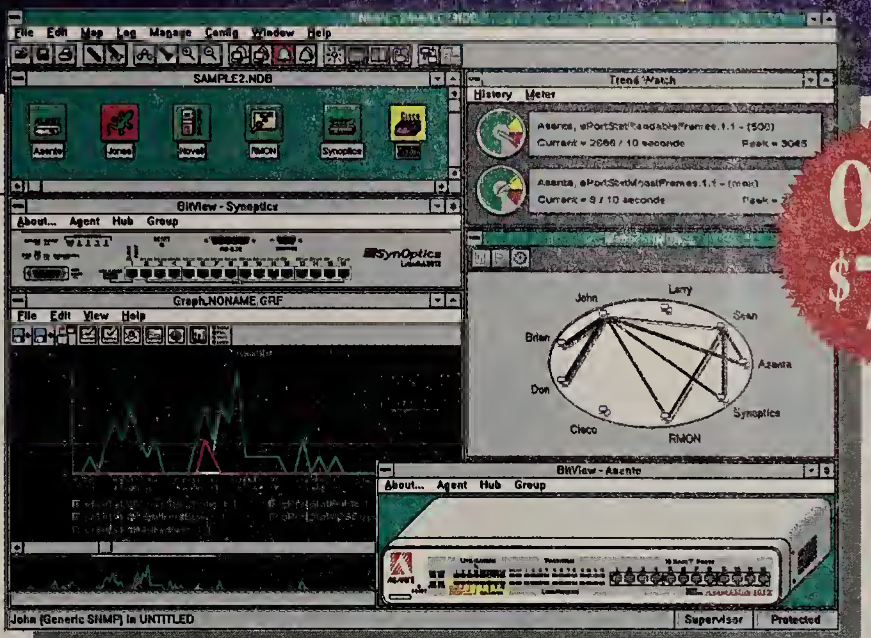

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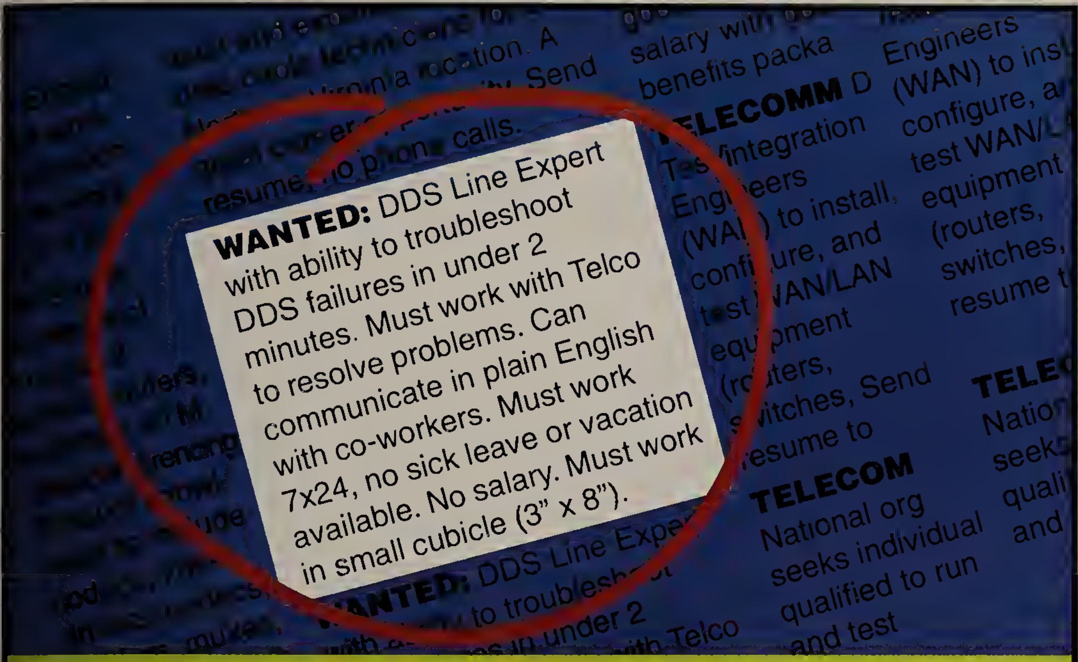

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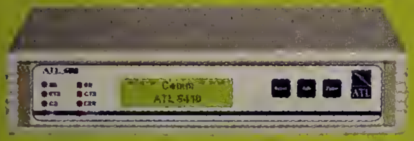

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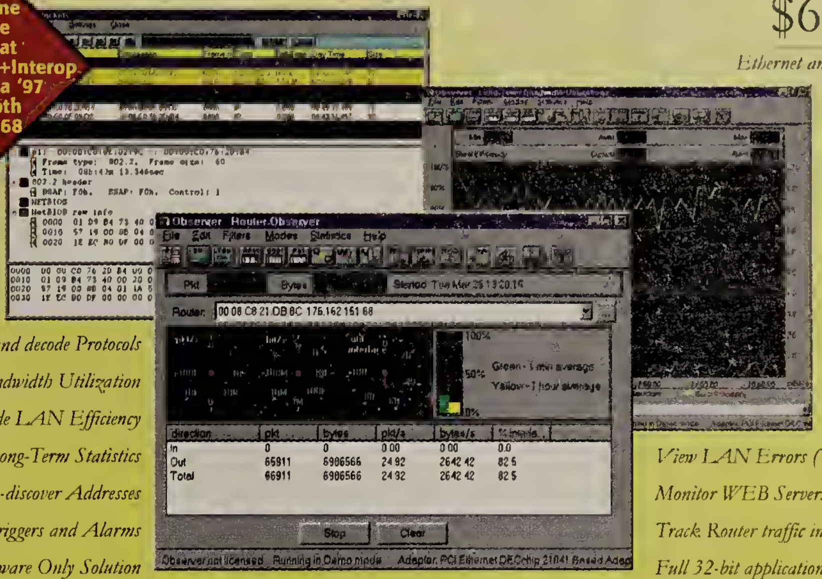
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In	0	0	0.00	0.00	0.0
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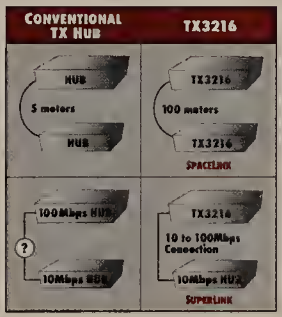

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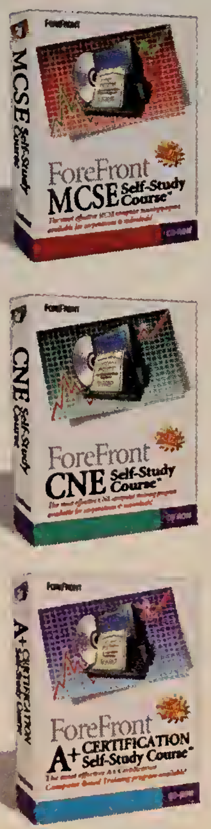

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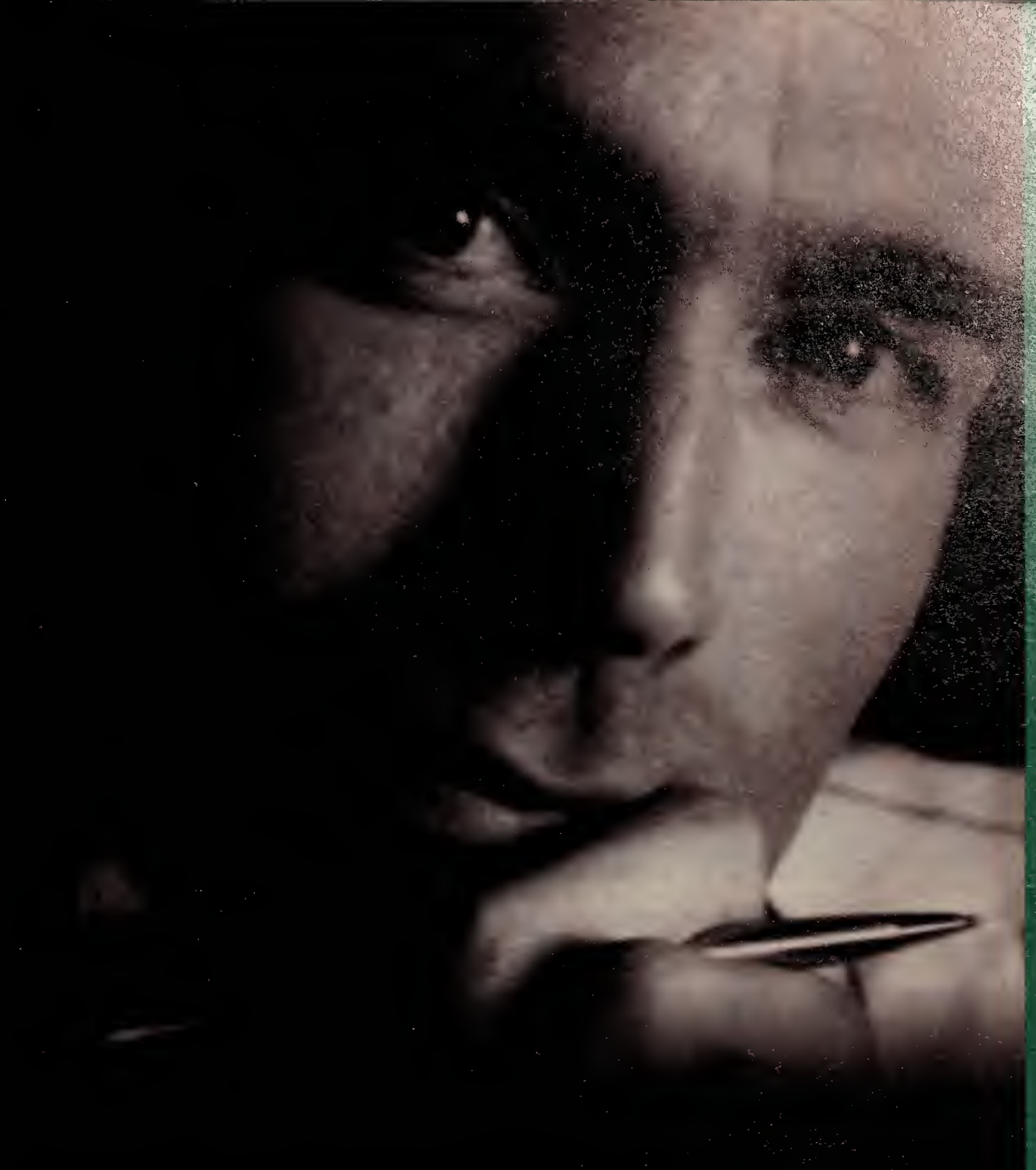

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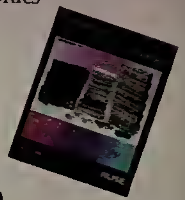

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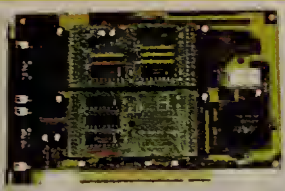

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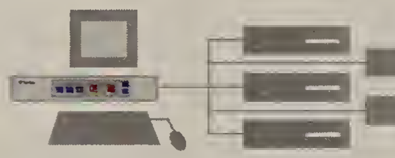

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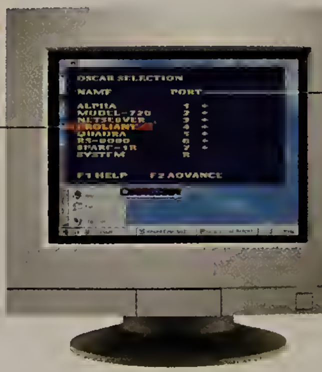

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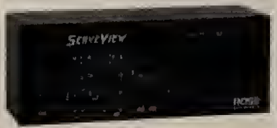

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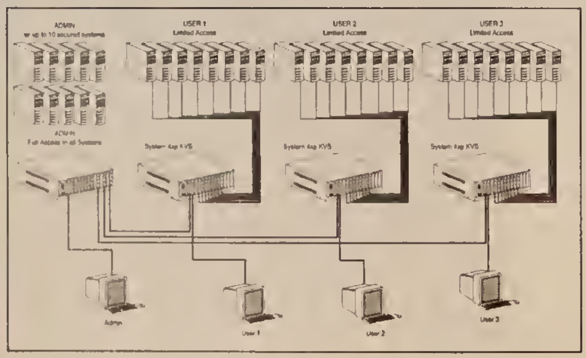

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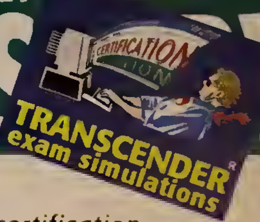

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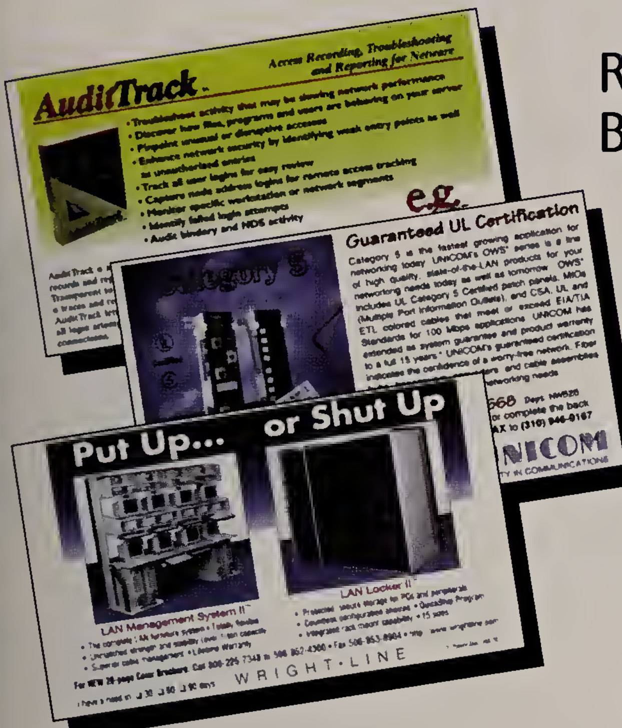

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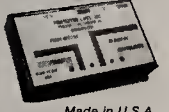

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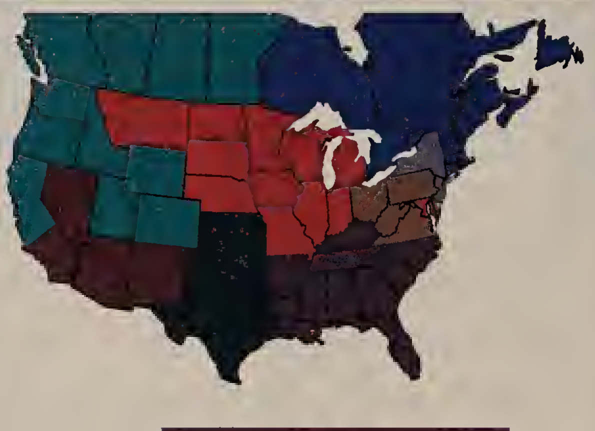

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Actra

Continued from page 1

ing hard to sell the Actra line, and Netscape's success has been particularly galling to GEIS.

Netscape has been cheerfully selling ECXpert along with some of its own products, such as the recently announced SuiteSpot Hosting Services package, to telecommunications giants such as Bell Canada. The result of the deal will be to transform Bell Canada into an Internet EDI value-added network (VAN) — competing against the GEIS proprietary VAN.

GEIS, which does not have as much Web experience as Netscape, has relied largely on Netscape to develop the Actra product line. Those products compete to a degree against some traditional GEIS EDI software and services.

Actra, based in Sunnyvale, Calif., now has 170 employees. The sales team is divided to serve GEIS and Netscape separately.

GEIS and Netscape did not think they would bump into each other trying to win customers, but their hopes were in vain. "We're competing hard as channel partners," said Kevin Huff, marketing manager at GEIS.

Netscape and GEIS have decided not to cobrand the Actra line, which includes the new SellerXpert electronic catalog and sales tracking software.

Not in sync

The two companies do not always act as one. For instance, GEIS several weeks ago was annoyed when Netscape jumped the gun and announced it was distributing SellerXpert. Netscape said it told GEIS its plans, so it should not have been a surprise. GEIS later announced it now is offering SellerXpert.

Officially, GEIS declined to comment in detail about the relationship. According to GEIS spokeswoman Meredith Roth, "there have been some inherent complications from the beginning we're trying to resolve. There have been some hiccups in the relationship."

Netscape remains bullish on Actra. "Things are working fine from our point of view," said Wayne Dyer, director of application product marketing at Netscape. "This is the wave of the future. Actra plays a strong role in our strategic vision."

"Netscape 'went ballistic' when they were told KPMG Peat Marwick joined with Microsoft for electronic commerce."

Robin Palmer, consultant, KPMG Peat Marwick

ED QUINN

Netscape said it now has 200 customers for the Actra line and is adding dedicated sales people — including some from GEIS's mortal EDI enemy Sterling Commerce Software, Inc. — to sell the products.

Though it boasts Boise Cascade Co. as an ECXpert user, GEIS declined to say how many Actra customers they have.

Microsoft a homewrecker?

Whether GEIS and Netscape are just having a lover's quarrel or the relationship is headed toward splitsville is hard to say. Some do not rule out the possibility that Microsoft could come between GEIS and Netscape.

There already is a strong Microsoft-GE tie. General Electric Co. owns GEIS as well as NBC. NBC has a strategic relationship with Microsoft in media venture MSNBC. According to GEIS sources, Microsoft Chairman and CEO Bill Gates lately has made it plain to GE Chairman Jack Welch that he does not like the Actra alliance. Sources have not ruled out a Microsoft-GE deal to develop EDI software — the Microsoft way.

PROFILE: ACTRA BUSINESS SYSTEMS LLC

Based:	Sunnyvale, Calif.
Founded:	April 1996 by GEIS and Netscape
Management:	Jim Sha, president and CEO, formerly with Netscape and Oracle; Larry Fox, chief financial officer, formerly with GEIS; Ray Rike, vice president of sales and marketing, formerly with GEIS and CompuServe
Employees:	170
Products:	CommerceXpert, an integrated family of Internet commerce application solutions

I will not be ignored

Despite Netscape's public posture, getting the company's attention for electronic commerce projects is not always easy.

Robin Palmer, a consultant and national partner in charge of the electronic commerce division at KPMG Peat Marwick LLP, was contacted by a Fortune 100 company that wanted to price Netscape products for installation. Palmer could not even get Netscape's attention to ask them to deliver a business presentation.

The Fortune 100 company then called KPMG to broker a Netscape interview. KPMG worked out an agreement with Netscape to be a preferred systems integrator — a privilege shared only by EDS Corp. and Arthur Andersen & Co.

A few weeks ago, KPMG announced it had struck a similiar deal with Microsoft, which had actively sought KPMG's support to sell Microsoft Web-based products. Netscape "had an extreme reaction, saying they felt betrayed," Palmer said.

He added he hoped he had succeeded in assuring Netscape that KPMG had not abandoned them.

So far, Microsoft's approach toward EDI has been to give support to EDI vendors such as Sterling Software, Inc. Sterling is fielding EDI systems for the Internet that are dependent on Microsoft NT.

Microsoft "is trying to enable third-party independent software vendors for EDI on the 'Net to integrate their directory services and digital certificates," Palmer said. ■

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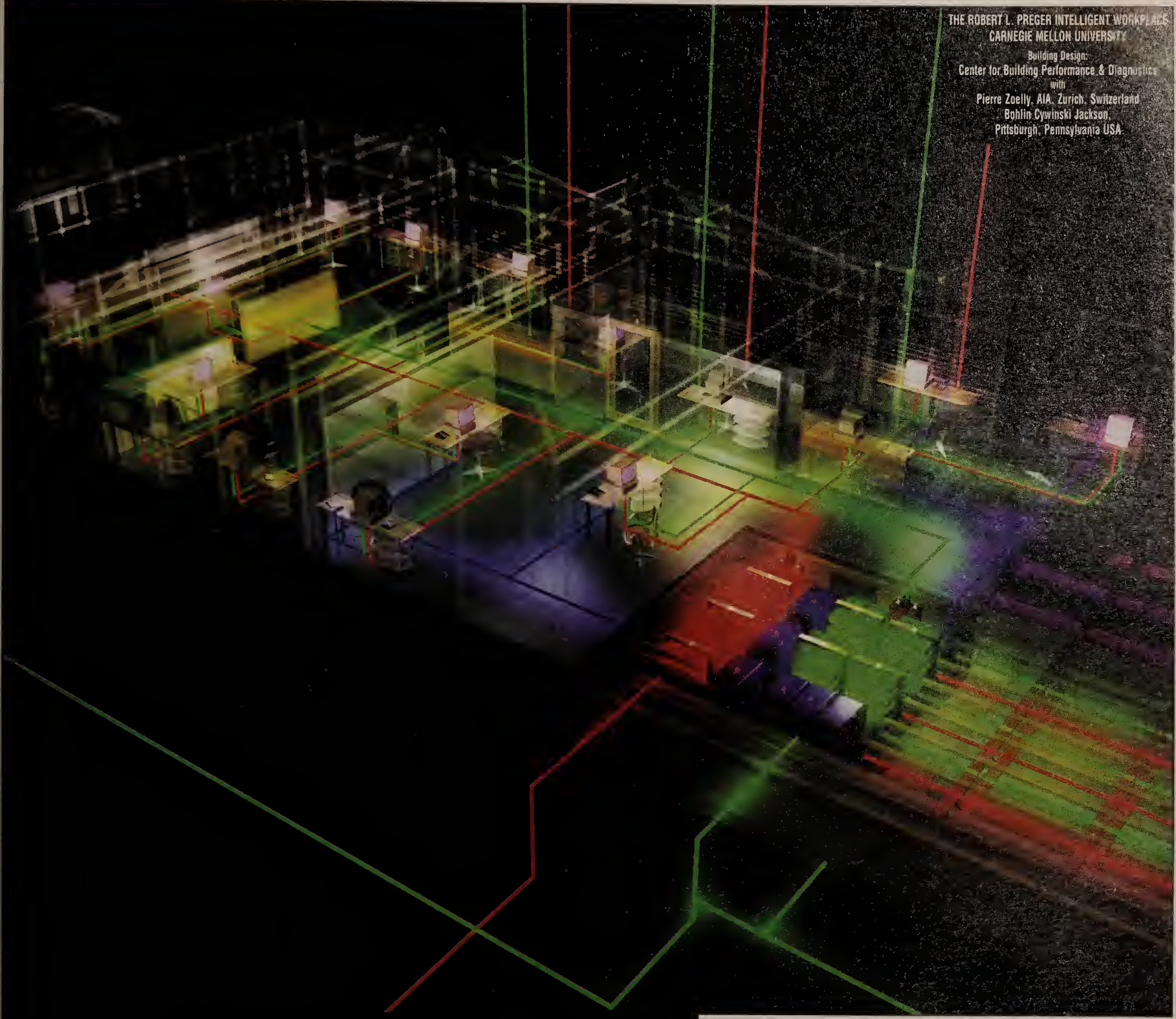
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WorldCom

Continued from page 1

WorldCom announced it was purchasing Brooks Fiber Properties, Inc. Brooks is a fast-growing competitive local exchange carrier (CLEC) that typically has built fiber rings in smaller cities than those served by WorldCom.

Key to the deal is the combination of local fiber rings built by WorldCom, Brooks Fiber and MCI, together with MCI's emerging Synchronous Optical Network (SONET)-based long-distance network. In fact, MCI just announced an end-to-end SONET service, although it requires access rates of 45M bit/sec and faster (see story, page 41). That broadband focus should dovetail with the deal WorldCom struck last month with America Online, Inc., CompuServe, Inc. and ANS Communications, Inc. WorldCom gained CompuServe's network business and ANS, but dumped CompuServe's basic online users on AOL.

WORLDCOM'S BUYING SPREE

WorldCom is a telecommunications giant, self-created by acquisition.

Year	Company acquired	Cost
1992	Advanced Telecommunications	$585.6 million
1993	Metromedia	$1.2 billion
1994	IDB Communications Group	$879.8 million
1995	Williams Telecommunications Group*	$2.5 billion
1995	GridNet International	Bought a majority stake**
1996	MFS Communications, which owned UUNET Technologies	$13.6 billion
1997	CompuServe Network Services division***, ANS Communications***	$1.4 billion
1997	Brooks Fiber Properties***	$2.3 billion
1997	MCI Communications***	$30 billion

*Fiber-optic network and network services only; Williams distribution business unit still intact.

**Bought remainder of company in July 1997.

***Merger or acquisition not final.

"It was a superb deal," said Dan Taylor, consultant at Aberdeen Group, Inc., a Boston-based consultancy. "They can take the bones out of the fish and still keep the skin intact."

No hassles with foreign carriers

The large number of customers of both MCI and one or more of WorldCom's divisions already have visions of a single global voice and data contract. Enormous volume discounts dance in their heads.

"If the acquisition takes place, I will be talking to the salespeople, and you know and I know that will come up," said Bill Dyer, director of information systems and technology services for Cincom Systems, Inc., a software firm in Cincinnati.

Cincom uses MCI for its domestic frame relay service but WorldCom for its pan-European frame relay service, Dyer said. Part of WorldCom's overseas appeal for Cincom is its fiber city rings in cities such as London, Paris and Frankfurt. The fiber city rings were built by MFS Communications Company, Inc., which WorldCom bought last year. This means Cincom does not have to deal with domestic carriers in foreign countries, often a headache for network IS managers.

In addition, MCI notified Dyer that it could offer him local access in Chicago over its own facilities as a competitor to Ameritech Corp.

But because WorldCom serves 52 local markets and thousands more local fiber miles than MCI, a WorldCom/MCI merger could enable Dyer to consider switching numerous offices away from regional Bell operating companies rather than one at a time, he noted.

Likewise, MCI user JumboSports, Inc., a Tampa, Fla.-based sporting goods retail chain, is seriously looking at switching to MCI's local business services by the end of the year after its contract with GTE Corp. expires, said Tom McCormick, senior manager of Jumbo Sports' store systems/PC support.

While MCI local business services are available in Tampa, JumboSports has stores around the country where MCI is not offering local services. McCormick said he hopes WorldCom will bring new services to the table, especially in the local arena. "We are also hoping that our Internet prices will go down," McCormick said. "MCI's services are good, but you pay a premium for them."

Some users were not counting the synergies just yet. "Each company has its own culture and business style, so how will we know if this will be another Bay Networks or if it will run smoothly?" asked Tod Bryant, director of information systems at New York Life Benefit Services, Inc., a Norwood, Mass.-based benefits company that uses dedicated Internet access services from WorldCom's UUNET Technologies.

Some MCI users have already steeled themselves against the potential upheaval. MCI has been in a prospective merger for nearly a year, noted Dawson Newberry, MIS director at Gerald Metals, Inc., a global commodities trading firm based in Stamford, Conn. "I've been pleasantly surprised. The overall service from MCI has not declined, and I was worried about that," Newberry said.

What about frame relay?

Nevertheless, a host of thorny issues awaits a WorldCom/MCI deal.

For example, MCI has a far greater installed base of users for most traditional long-distance services. WorldCom does not offer a traditional virtual private network service such as MCI's Vnet, which provides outbound voice dialing via special dialing plans under a discount rate schedule.

The solution: A savvy WorldCom should defer to MCI on those services as if the merger were going the other way, said Steve Sazegari, president of Tele-Mac, a telecom consulting firm in Foster City, Calif. "They should move their customer base to the MCI networks and just get rid of whatever they have," Sazegari said.

A bigger problem area is corporate fast-packet services, which have lost the glamour spot in both companies to the Internet, even as their popularity explodes. According to the just-released "ATM and Frame Relay Industry Update" from market research firm Vertical Systems Group, of Dedham, Mass., MCI and WorldCom have suffered frame relay market share losses in 1997. ■

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Now where will AT&T get its local loop?

So you're AT&T, and your biggest long-distance competitor may merge with the carrier that has the largest number of freshly laid local fiber rings. Even worse, regulators have scolded you for even thinking about merging with your former Bell local subsidiaries. What's an ultraconservative long-distance carrier giant to do?

Pundits last week pointed in one direction: merger talks with non-Bell local powerhouse GTE Corp.

AT&T's failure to break into the local exchange market could escalate into a crisis if an MCI Communications Corp./WorldCom, Inc. merger materializes. In addition to the 52 local markets currently served by WorldCom, MCI's local services business would add nine more cities where WorldCom currently does not have a presence.

In addition, WorldCom's announcement that it is purchasing competitive local provider Brooks Fiber Properties, Inc. adds another 34 second-tier cities to the list, WorldCom officials said.

"It leaves AT&T in a position of either acquiring a Bell company or a GTE," said Tom Jenkins, a broadband consultant with TeleChoice, Inc., a Verona, N.J., consultancy. "I don't believe at this point that AT&T could catch up to the market by building local networks. Now they have to buy their way in."

Regulators have discouraged AT&T from merging with a regional Bell operating company, but GTE presents a different scenario, Jenkins said. GTE already offers long distance, has a strong Internet presence thanks to its recent purchase of BBN Corp., and exists in enough local markets that it can economically backhaul traffic to nearby central office switches, Jenkins said.

The biggest problem: The cost of an acquisition. GTE's current market valuation is about $50 billion, so analysts said AT&T might have to do more of a merger of equals than a takeover.

"But it's too late for AT&T to go and build infrastructure," said Steve Sazegari, president of Tele-Mac, a Foster City, Calif., telecom consulting firm. "They should have acted much earlier. They didn't even take the initiative to go and buy a [competitive local exchange carrier]."

For its part, AT&T urged users to remember that mergers usually follow a tortuous path. "AT&T wishes its colleagues in Washington and London well as they try to sort through these new developments in the coming days, weeks, months and years," the carrier said in a prepared statement. AT&T said it will continue considering "every possible option to enter local markets without laying out undue amounts of capital." It added, "WorldCom's latest play doesn't affect our strategy in the least."

—David Rohde

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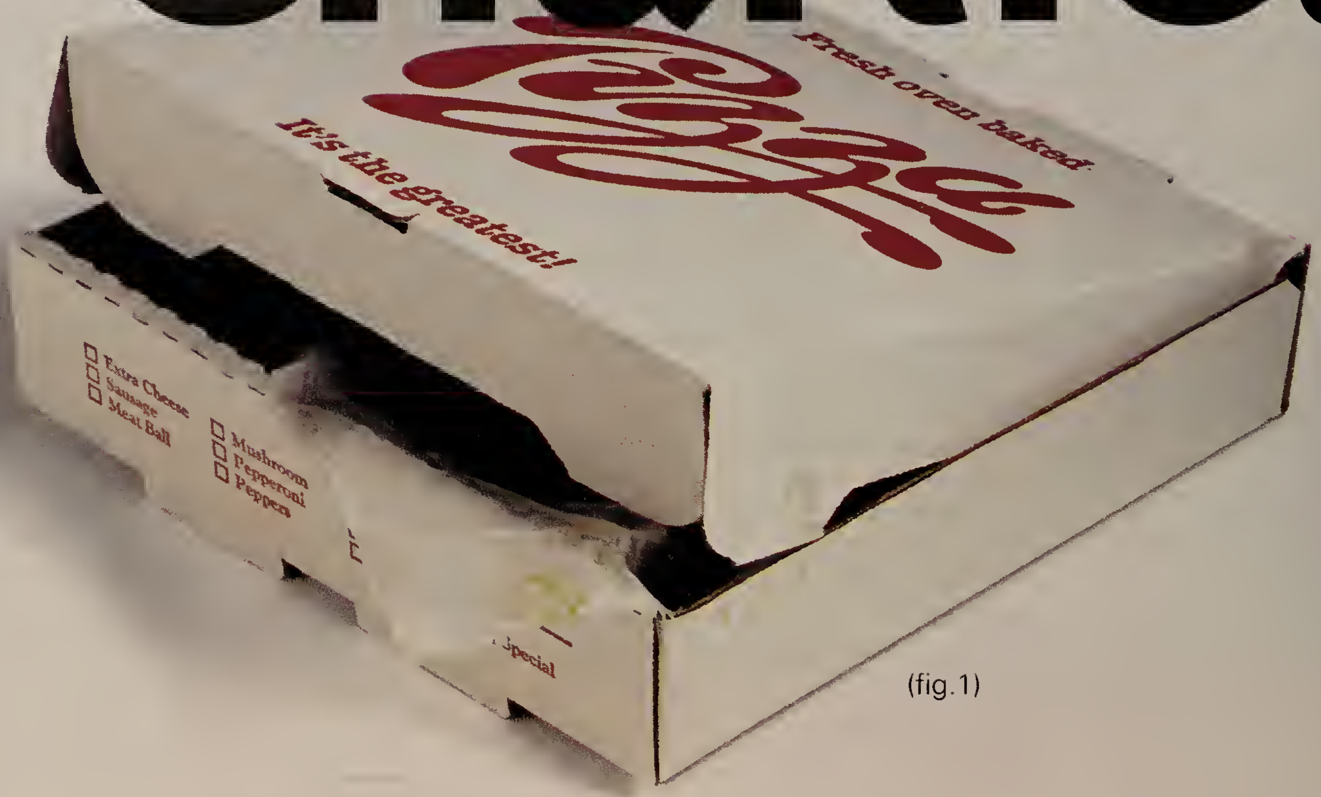

(fig. 1)

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Circle Reader Service #9

New Java applications will test network computers

Oracle and its Network Computer subsidiary ready new offerings.

By John Cox

Java applications, designed from the inside out for network computers (NC), are just starting to arrive on users' desktops. The big question now is whether the programs represent a new direction for applications . . . or a dead end.

Oracle Corp.'s Network Computer, Inc. subsidiary last week said it will bundle StarOffice 4.0, from Germany's Star Division, GmbH, with NCI's server software for setting up and managing Java NCs. StarOffice 4.0, now entering beta testing, is an advanced Java application for word processing, spreadsheet and presentation graphics. The product's features are comparable to those in PC packages such as Microsoft Office.

Later this month, Oracle plans to release a much simpler set of Java office applets, formerly bearing the code name Hattrick, that have been in development for nearly 18 months. Renamed Oracle InterOffice Composer, this software will be able to run as part of Oracle's InterOffice suite or as a stand-alone Java application. Pricing for both products will be announced at a later date.

Real Java applets

NCs are designed to run a midget operating system, download and run Java applets, and view HTML documents. But most NC customers today are running optional software to access applications running on Windows NT or Unix servers, and on IBM mainframes, because mainstream Java applets have not been available.

StarOffice 4.0 has major changes compared with Version 3.1, which has been selling in Europe. Version 4.0 comprises the following: a Java client; StarOffice Application Server, which runs the main part of the office software code; and StarDesktop, a new approach to end-user interaction.

StarDesktop creates a uniform user interface that is "task-oriented." Users open a folder that represents a given task, such as "September Sales Report." From this folder, users can find and import existing text, spreadsheets, graphics and Web-based information. "StarDesktop lets you manage your work, not just your files," said Marco Börries, Star Division's president. The Java version of StarOffice downloads to an NC, creating the StarDesktop, and connects the user to the balance of the application functions running on the server.

Oracle's software is aimed at users who need only a small subset of the features and functions found in products such as StarOffice, said Oracle's Steve d'Alencon, a senior director of product management and marketing. Oracle's all-Java application lets users create a range of documents by using a set of graphical templates. The templates walk the user through document creation by providing a menu of choices from which to select, such as page layout.

All Oracle InterOffice Composer documents are saved as HTML files. As a result, users can cut and paste among any HTML documents. Target customers tend to be those who work with a few custom applications and do not need the elaborate features and graphical user interface of the full-blown PC office suites, d'Alencon said. ■

Interop spotlights net security products

By Ellen Messmer
Atlanta

Feeling a little insecure? If so, you might want to check out NetWorld+ Interop 97's security product pavilion this week, where dozens of new network security products will be on display.

Among the participating vendors is V-ONE Corp., which will demonstrate SmartGate Enterprise, gateway software that combines firewall, access control and authentication technology to secure TCP/IP traffic traveling between intranets and the Internet.

The product provides customers with a multiaccess virtual private network, said Jim Chen, chairman and CEO of V-ONE, which is based in Germantown, Md.

SmartGate Enterprise, which runs on Windows NT or Unix, acts as a firewall. It can grant network access by checking users' X.509 digital certificates.

V-ONE's *Chen*

The software, which will ship later this month, uses a proprietary method for checking X.509 certificates, rather than the emerging IP Security (IPSec) key-management standard for authentication. V-ONE plans to in corporate IPSec if support for it grows.

Another vendor, TimeStep Corp., will announce its brand of multiaccess gateway, Permit Enterprise. The hardware product, slated for December delivery, incorporates TimeStep's signature Permit encryption gateway with firewall technology licensed from Check Point Software Technologies, Ltd.

TimeStep also has added an X.509 directory console to its secure gateway that lets network managers issue, revoke and store public-key certificates for employees or trading partners.

If you are near the security pavilion, it will be hard to miss hearing the term "digital certificates." There, Entrust Technologies, Inc. will unveil Entrust/Direct, a browser add-on that lets you scramble messages using 128-bit encryption.

Entrust/Direct was developed at the request of the banking community for new online banking services. The product will enable bank customers to authenticate themselves without having to use passwords sent over the Internet.

Amid the glowing security screens at the pavilion, you'll undoubtedly find Microsoft Corp. showing off Proxy Server 2.0, its new Internet proxy for filtering Internet applications.

As is usually the case, smaller vendors will be crowding under the Redmond, Wash., giant's umbrella. Among these firms will be antivirus software rivals McAfee Associates, Inc. and Trend Micro, Inc. Both have developed ActiveX and Java filtering software, in addition to antivirus scanning software, specifically for Microsoft Proxy Server 2.0.

Trend Micro also will unveil a new way to distribute antivirus software to the desktop using ActiveX. Trend Micro Client Protect, a Web server-based product, will let corporations distribute antivirus software by placing it on a Web server. Then, any user with an ActiveX-based browser, such as Microsoft's Internet Explorer 3.0 or 4.0, can download it automatically by visiting a Web page. The software will ship early next year.

✆ Entrust: (613) 247-3418; McAfee: (408) 988-3832; Microsoft: (425) 882-8080; TimeStep: (800) 383-8211; Trend: (408) 257-1500; V-ONE: (301) 515-5200

CORRECTIONS

Mary Petrosky's opinion column "High-Speed Token Ring: More Band-Aid than boon" (Sept. 22, page 45) misstated the nature of the relationship between Olicom and Cisco in developing next-generation token-ring switches. The two companies jointly developed the core technology for these switches but are marketing them separately.

We ran the wrong number for Pacific Bell in a brief about new Web hosting services (*NW,* Sept. 22, page 29). The correct number is (888) 724-7253.

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Circle Reader Service #28

MPOA

Continued from page 1

notably gear from FORE Systems, Inc., Bay Networks, Inc., Newbridge Networks, Inc. and possibly Cabletron Systems, Inc. — getting MPOA support may only require a software upgrade. But for users of products from such companies as Cisco Systems, Inc. and 3Com Corp., the upgrade will involve swapping out hardware — and that could cost a lot in time, money and network reconfiguration.

"You need to be real, real careful to understand what the benefits of extending MPOA into your network are going to be, and make sure you only extend it as far as the benefits will cover the cost," said Tom Nolle, president of CIMI Corp., in Voorhees, N.J. "The closer to the desktop you come with it, the more costly [it is]."

ATM networks with more than 4,000 users will be those most likely to add MPOA to the edge for greater scalability and higher Layer 3 performance, vendors said. Conversely, smaller networks likely will retain Layer 2 LAN Emulation functionality at the edge and rely on a central MPOA server for route calculation and forwarding.

PUTTING MPOA TO THE TEST

Scheduled participants for the MPOA demonstration at NetWorld+Interop 97:

- 3Com
- Bay Networks
- Cisco
- Network General
- Newbridge

"It's not the cost of upgrading five systems or two systems in the data center; it's upgrading what you have in the wiring closets, which tends to be a far greater number," said Melinda Le Baron, a research director at Gartner Group, Inc., in Stamford, Conn.

Cisco and 3Com users face the most dramatic upgrade to MPOA. For Cisco customers, the move will require replacing the OC-3 LANE card in the Catalyst 5000 switch with an OC-12 MPOA card coming early next year, said Dave Benham, Cisco's ATM product manager. An OC-3 MPOA card will come months later, and Cisco routers with ATM interfaces require only a software upgrade, he said.

Benham would not say how much the MPOA-enabled OC-12 and OC-3 cards will cost. Cisco's current OC-3 LANE cards for the Catalyst 5000 cost about $10,000. MPOA will be backward-compatible with LANE, he said, so users need not deploy MPOA everywhere.

Nonetheless, Cisco's upgrade plan caught some users off-guard. Doyle Friskney, director of communications and network systems at the University of Kentucky in Lexington, was hoping that Cisco would provide MPOA as a flash RAM download.

"I have 30 Catalyst 5000s on campus so it will be a major board swap-out," he said. "I assume if you have some kind of maintenance plan, you're going to be in good shape. I've never had a major [upgrade expense] problem with Cisco. My worry will be more on how will I do the transition and should I even do the transition."

"We have 15 Catalyst 5500s on campus," said Allen Robel, senior network analyst for Indiana University's computer services department in Bloomington. "We would have to upgrade all of those."

3Com suggests customers consider the transition to MPOA very carefully because it will require them to replace 3Com Layer 2 switches, said Rick Forberg, product line manager of ATM internetworking at 3Com.

‘You can't run a Layer 3 forwarding process on a Layer 2 edge device, and I'll grant you that most 3Com edge devices are Layer 2," Forberg said.

He recommends the company's Fast IP technology for Layer 3 switching at the edge of the ATM network. But Fast IP has its drawbacks. For one thing, it is proprietary, while MPOA is a standard. Also, MPOA allows you to route a packet between Ethernet and token ring. With Fast IP — which does Layer 2 forwarding — a packet that comes in Ethernet has to go out Ethernet.

"3Com realizes the move to MPOA is disruptive, which is why we offer Fast IP," Forberg said. "Fast IP lets you do the same things as MPOA but you don't have to replace Layer 2 switches. Customers could save hundreds of thousands of dollars."

3Com will support MPOA because customers likely will want it as they replace devices in the future. The company is expected to announce its MPOA plans for its CoreBuilder 3500 and 7000 switches at this week's NetWorld+Interop 97.

FORE's MPOA strategy requires only a free software upgrade to core switches, edge devices and ATM adapters, said Michael Ladam, product manager at FORE.

ATM adapter cards and Layer 2 Ethernet switches with an ATM uplink need a new software driver to support MPOA.

There is no question in the mind of Sergeant James Chlebus, functional area network manager for the U.S. Air Force's 17th training group in Texas, that his FORE boxes are MPOA-ready. But an upgrade might not be so easy with his Cabletron equipment.

"We're told that Cabletron isn't so sure about a software upgrade," Chlebus said. "They told us they are looking at MPOA as a firmware/hardware upgrade depending on the product. A firmware upgrade — if not a flash download — can require an additional card to work."

"It's easy to upgrade to MPOA," said Tim Hale, ATM program manager at Cabletron. "It's just a matter of a flash download of MPOA code onto the devices."

Cabletron's MPOA firmware upgrades will be available in the first quarter of 1998 and free for most customers, Hale said. Bay Networks also will come out with standard-compliant MPOA software for its Centillion 100 and System 5000BH devices in the first half of next year, said Brian Brown, director of product strategy for Bay's switching products.

Newbridge has been one of the most bullish MPOA supporters. The company has been shipping a prestandard version of MPOA for some time.

"If you've got our Layer 3 edge devices or ATM switches, you're all set since we've been shipping prestandard MPOA product for more than a year," said Lou Martinage, manager of product marketing at Newbridge. "And if you want to add existing Layer 2 LAN switches to the mix, you just connect them into our MPOA edge devices." ■

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SNA

Continued from page1

they want in.

IBM and Cisco executives were quoted praising the organization in an OpenConnect press release issued last week. But somewhere along the line, IBM and Cisco got cold feet.

IBM officials have denied involvement in the group and said the company already had its own integration products.

Cisco also claimed it was not in the alliance and did not plan to join — this despite the fact that one of Cisco's executives was quoted in the press release saying the organization "provides the user community with a single, credible focal point for standards, answers and solutions to any and all technology pertinent to bridging the current gap between intranets and traditional data centers."

The idea that IBM and Cisco would not want to be part of the same SNA-related group does not come as a shock, given the companies' history of battles in this area. For example, the two companies recently duked it out over performance tests involving their mainframe channel-attached devices.

Admirable goals

The alliance's goal is to bring together multiple vendors to standardize products that allow mainframe or AS/400 computers to work with TCP/IP networks.

The alliance's chair is Anura Gurugé, an independent consultant. Gurugé last Wednesday said the alliance could begin investigating the implementation of new SNA technology, such as IBM's recently announced tn3270E browser for SNA access or Data Link Switching.

A still bullish Gurugé said SNA and TCP/IP were not mutually exclusive technologies and it was time to "produce a uniform front" to "ensure interoperability" between the different vendors involved.

So what exactly happened to a group that showed so much promise? All Gurugé would say is there were membership issues being resolved, and that the alliance's ranks were swelling — whether or not IBM and Cisco joined.

OpenConnect also declined further comment.

However, sources at OpenConnect, on whose stationery the announcement appeared, said it was unclear why the press release was issued before getting commitments from IBM and Cisco. The sources agreed the release went out prematurely.

Despite the snafu, OpenConnect remains committed to the alliance, and the initial meeting will take place this week in Atlanta as scheduled. The sources also claimed that some multibillion-dollar vendors plan to attend and support the alliance.

There is no doubt that users would enjoy the benefits of such a union. "I'd love for them to get together," said Renee Radecki, systems administrator at Allianz Life Insurance Company of North America, in Minneapolis. Her 700-to-800-client network relies on SNA and TCP/IP, and she said integrating the technologies is a problem. ■

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Circle Reader Service #19

Chambers

Continued from page 12

gic, integrated vendors. Bay, like 3Com, has loopholes in their product line. They have good point products, and a large amount of their success over the last quarter or two has been because they've got a real good switch [Switch Node]. But if you look out more than 18 to 24 months, that will determine whether they have a chance to go back to the top one or two.

You have a new set of competitors. I'm referring to companies like Juniper that are promising new high-speed routers for the Internet. Do you see them as a competitive threat?

Oh, the answer is absolutely yes. I view all start-ups with point products as competitive threats. Having said that, the market has changed. The customers are not making point product decisions in most situations. Many of them have already selected the vendor and to make that kind of change is painful, to say the least. There has to be a huge competitive reason to change. I would like to remind people that's the same question we got about Ipsilon 12 to 24 months ago. A great marketing campaign, but I haven't been asked about Ipsilon in the last four months.

Why do you think Juniper has gotten this industry backing? (Juniper partners include 3Com, Nortel and Newbridge Networks, among others.) Are customers looking for an alternative to Cisco?

Well, let's be realistic about who is backing it. They are either Cisco competitors or think they are going to be Cisco competitors. It's quite a compliment that these companies can't compete against Cisco by themselves. To even have a chance, they've got to combine and provide input into anybody who might be able to challenge Cisco. You have people who are tremendous competitors, Lucent and Nortel, for example, funding this. These are companies that are very concerned about Cisco's competition vs. them.

The next paradigm change for Cisco and the industry is the integration of data, voice and video. And we are moving very, very rapidly there. For Lucent or Nortel not to realize that we could be either a very powerful partner or a very powerful competitor would be a naive position.

What don't people understand about the story that companies like Juniper and others are pitching about the Internet?

We already have a product today in the 12000 [Gigabit Switch Router]. It is already in the Internet in production at the OC-12 level. We've shown an architecture that can go up to 100 million packets per second if we execute it right. This is going to be a much tougher market to enter than people realize.

You bought into Gigabit Ethernet early with Granite Systems, but you are relatively late to market. Is there a problem with that technology?

Our view on the opportunity of Gigabit has not changed. We think with the price points, the functionality, it's going to be a major player in the market. But, when people say they've got a product, the question is: Is it really a true Gigabit switch with all the functionality of software?

We cannot, nor will we, do the same thing a start-up does, which is bring out a product and — using Geoff Moore's *Inside the Tornado* analogy — not worry about customer satisfaction when you launch and let your customers shake it out for you. Our customers put our products straight into the core of the network that runs their business, and so the expectations of quality are high.

We also made the decision not to design a stand-alone product. The density of our chip is the price/performance advantage that we have. It's pushing the edge of technology, and when you boost the technology that much, your ability to bring it out is a little bit slower. But if it's the price point, and the design and the density we think it will be, we'll have a great advantage. ■

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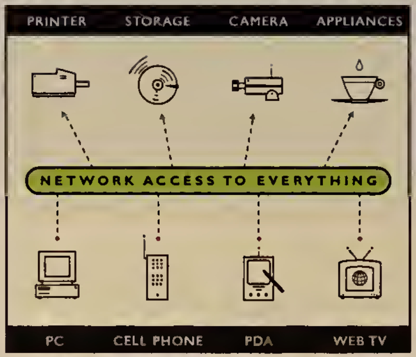

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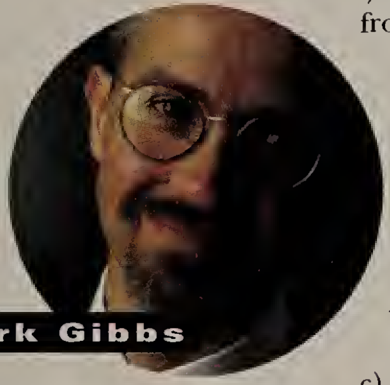
Circle Reader Service **#3**

Backspin

Quiz time: Are you certifiable yet?

Readers keep sending me letters asking if I think they should become Certified Novell Engineers, Microsoft MCPs (no, not a Male Chauvinist Pig — a Microsoft Certified Professional), or any of the many certifications vendors offer.

This is a hard question to answer for two reasons: 1. Much depends on their objectives; and 2. They haven't paid me a consulting fee.


Mark Gibbs

Anyway, there are so many certifications around that we at the Gibbs Institute of Management Of Network Engineering technologY (MONEY), feel that we should offer a program for those of you who recognize the need for a broad-based learning approach to the network business. We call it the Network Operations Certification Learned Under Extremis (NOCLUE for short).

To determine whether you have the skill and motivation to become qualified as a NOCLUE graduate, take our quick evaluation test:

1. The shortest distance between two access points on your network is:
   a) a straight line through the Coke machine
   b) through the ceiling/false floor
   c) across the Internet via Tokyo

2. Novell technical support generally answers within:
   a) 5 minutes
   b) 5 hours
   c) none of the above

3. Which is slowest:
   a) a 300-MHz Pentium Pro
   b) a 300-MHz UltraSPARC
   c) anything running Windows 95

4. The Internet is growing at:
   a) 10% per annum
   b) 10% per month
   c) 10% per journalist

5. Larry Ellison is:
   a) the CEO and chairman of Oracle
   b) the power behind the Microsoft/Apple deal
   c) a self-made man who worships his creator

6. Windows 95 was named for:
   a) the year it was released
   b) the average number of minutes it can run without failing
   c) the number of serious bugs found in it each day

7. The Macintosh user interface was:
   a) ripped off by Microsoft from Apple
   b) ripped off by Apple from Xerox PARC
   c) who cares?

8. Which of the following is the most dangerous:
   a) a programmer with a soldering iron
   b) a manager who codes
   c) a user who gets ideas

9. When designing a network, it is vital to:
   a) assess all user needs and future growth potential
   b) assess budgetary constraints and corporate policy
   c) make sure there's enough fat in the design to get yourself that hot, new multimedia machine

10. Users are:
    a) the reason for the network's existence and the focus of your efforts and attentions
    b) an irritating distraction from playing with technology
    c) what are users?

Score 1 point for each "a," 2 points for each "b," 3 points for each "c." If you scored more than 1, you are qualified to attend this course. We look forward to your check for $2,000, although we'd be pretty pleased if you got around to sending us only $20. Enroll today. You owe it to yourself to put "NOCLUE" after your name.

Register for the fall class with Professor Gibbs at nwcolumn@gibbs.com or read me the note from your mother ("Professor Gibbs, please excuse Frank from class as he has a runny nose.") at (800) 622-1108, Ext. 7504.

'NET BUZZ

The latest on the Internet/intranet industry

By Chris Nerney

A CAUTIOUS BUNCH OF BLOKES In his keynote address to an audience of 500 at last week's Venture Market Europe in London, **British Parliament** House of Commons member **Derek Wyatt** lamented the lack of risk-taking in the U.K.'s investment community.

"We simply don't have a venture capital culture in the U.K. because we're afraid of failure," said Wyatt, who chairs the All Party Internet Committee.

This fear, he said, is one reason the U.K. is "five to 10 years behind America in delivery systems for the Internet."

Jason Pontin, editor of ***The Red Herring,*** sponsor of the conference, agreed with Wyatt that "the entrepreneurial spirit really isn't here yet."

"You see a lot of technological brilliance in Europe, but there's still a lot of financial inexpertise," he said.

This, according to Pontin, makes it especially hard for early-stage start-ups to attract venture funds.

But this didn't stop more than 40 European companies from making their cases to the venture capitalists and financiers assembled at the Hotel Dorchester. Some of the more interesting firms include:

Autonomy Corp., Cambridge, England — Founded in 1996, Autonomy sells agent-based software enabling personalized information delivery for Internet and intranet content publishers. Yeh, we've heard it before, but who else uses a pitch like this?: "When Homer Simpson comes home from the power plant, he only wants to see information on baseball and beer." The company also has an office in Palo Alto, Calif.

Neta4, Jerusalem, Israel — Founded this year, the company sells software allowing merchants to issue virtual membership cards to customers so they can receive product- and service-related promotions individually. The software works with Open Profiling Standard and includes a 100% Pure Java-based client application.

WorldRes, Inc., London and San Mateo, Calif. — An Internet-based marketing and central reservation system for hotels to sell inventory on the World Wide Web and through multiple distribution partners.

DID I MENTION WE SHOULD REGULATE MICROSOFT? One of Wyatt's main themes during his keynote speech was the need for government regulation. In fact, he could scarcely mention **Microsoft** without raising the specter of eventual government intervention (he did this at least three times, by our count). This led to some skeptical questioning by *The Red Herring's* Pontin and some grumbling in the hallways during the first of many official tea breaks.

HERE COMES THE SUN Not everyone shared the gloomy assessment of the state of high-tech investing in Europe. **William Stevens,** a partner at Brussels-based **IP Strategies,** a consulting and research firm, says the European investment picture "will improve dramatically."

"There's lots of money to be made in early-stage venture capital," he says.

GENERALS AND MAJORS No fewer than three companies at Venture Market Europe are run by former members of the military. They are: **Data Technologies** of Tel Aviv, Israel (President **Eran Palmon** and CEO **Menachem Cohen,** both of the Israeli Defense Force); **Datatops** of Paris (CEO **Loyis Gay,** French Navy); and **Eldat Communication, Ltd.** of Bnei-Brak, Israel (CEO **Yossi Smoler,** Israeli Defense Force).

BRITISH WIT **Autonomy CEO Michael Lynch** on the ability of its Guardian Server to intelligently block objectionable content: "It won't stop information on chicken breast recipes, unless the recipes are being used in a salacious manner."

'Net Buzz will return to the States next week, which is more than we can say for the Ryder Cup. Contact: Chris Nerney at (508) 820-7451 or cnerney@nww.com

Allen Feryus, Senior Vice President and CIO, New York Mercantile Exchange: “DIGITAL Multivendor Custo
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